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SWEIS ANNUAL REVIEW–FY2001

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The pictures on the cover, from top to bottom, and left to right, include:

1. **A Sandia beekeeper and researcher holds a frame of honeybees that could potentially detect land mines that kill or maim thousands of people each year.**
2. **Sandia has been designing and building instruments for satellites since the 1960s. This one is an R&D satellite to demonstrate and evaluate advanced multispectral and thermal imaging for nonproliferation applications.**
3. **Burrowing Owls are protected on DOE and U.S. Air Force properties used by SNL.**
4. **An SNL/NM scientist examines a flowing plasma created by an electric field passing through a nitrogen-oxygen gas. This will save industry millions of dollars by ensuring peak plasma performance during microchip etching.**
5. **An aerial view of Sandia National Laboratories/New Mexico (SNL/NM).**
6. **A Sandia engineer uses a supersonic spray jet with a temperature of more than 3,000ºF to apply droplets of molten steel to aluminum. In partnership with industry, Sandia researchers have developed an economical way to make durable aluminum engines by spraying a wear-resistant coating onto cylinder walls.**
7. **Prairie Dogs are relocated whenever possible to avoid conflict with SNL/NM activities.**
8. **Sandia's robotic all-terrain lunar exploration rover (RATLER) can cross obstacles as large as its wheel diameter. It might be used to explore the moon.**
9. **The electrical light show of the Z Accelerator during activation.**

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SWEIS ANNUAL REVIEW—FY2001

A Comparison of FY2001 Operations to Projections Included in the Site-Wide Environmental Impact Statement for Continued Operation of Sandia National Laboratories/New Mexico

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ABSTRACT

The SNL/NM FY2001 SWEIS Annual Review discusses changes in facilities and facility operations that have occurred in selected and notable facilities since source data were collected for the SNL/NM SWEIS (DOE/EIS-0281). The following information is presented:

- An updated overview of SNL/NM selected and notable facilities and infrastructure capabilities.
- An overview of SNL/NM environment, safety, and health programs, including summaries of the purpose, operations, activities, hazards, and hazard controls at relevant facilities and risk management methods for SNL/NM.
- Updated base year activities data, projections of FY2003 and FY2008 activities, together with related inventories, material consumption, emissions, waste, and resource consumption.
- Appendices summarizing activities and related hazards at SNL/NM individual special, general, and highbay laboratories, and chemical purchases.

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ACRONYMS AND ABBREVIATIONS

A&F – arming and firing

ac – acre(s)

AC – alternating current

AD – anno domini (Latin, 'in the year of the Lord'; used to designate centuries)

ACGIH – American Conference of Governmental Industrial Hygienists

ACRR – Annular Core Research Reactor

AEC – Atomic Energy Commission

AFWL – Air Force Weapons Laboratory

AHF – Advanced Hydrotest Facility

AHR – advanced hydrodynamic radiography

AICE – American Institute of Chemical Engineers

ALARA – as low as reasonably achievable

ALEC – advanced laser external cavity

AMPL – Advanced Manufacturing Processes Laboratory

ANSI – American National Standards Institute

APPRM – Advanced Pulsed-Power Research Module

Ar - argon

ASME – American Society of Mechanical Engineers

AWN – Acid Waste Neutralization (plant)

B – billion(s)

BDBA – beyond design-basis accident

BST – building source term

BTU – British thermal unit

CAA – Clean Air Act

CAD – computer-aided design

CAM – computer-aided manufacturing

CEDE – committed effective dose equivalent

CFR – Code of Federal Regulations

CHEST – Conventional High Explosives & Simulation Test (Chestnut Site)

CHNO – carbon, hydrogen, nitrogen, and oxygen (explosives)

Ci – curie(s)

cm – centimeter(s)

CNC – computer numerical control

CO – carbon monoxide

Co – cobalt

CSPRA – Compact Short-Pulse Repetitive Accelerator

CSRL – Compound Semiconductor Research Lab

CTB – Cathode Test Bed

CTF – Coyote Test Field

CTTF-West – Containment Technology Test Facility-West

CWL – Chemical Waste Landfill

CY – calendar year(s)

D&D – decontamination and demolition

DARHT – dual-axis radiographic hydrotest

DAS – data acquisition (system)

dB – decibel(s)

DBA – design basis accident

DC – direct current

DCG – derived concentration guide

DIS – diagnostic instrumentation system

DoD – Department of Defense

DOE – Department of Energy

DOE/AL – DOE/Albuquerque Operations Office

DOE/KAO – DOE/Kirtland Area Office

DOE/OKSO – DOE/Office of Kirtland Site Operations

DOT – Department of Transportation

DP – Defense Programs

dpm – disintegrations per minute

DU – depleted uranium

EA – environmental assessment

EBA – evaluation-basis accidents

ECL/ADM – environmental checklist/action description memorandum

ECF – Explosive Components Facility

EDE – effective dose equivalent

EID – Environmental Information Document

EOC – Emergency Operations Center

EOD – Explosives Ordnance Disposal

EPA – Environmental Protection Agency

ER – environmental restoration

ES&H – environment, safety, and health

eV – electron volt(s)

FAIT – Facilities Asbestos Implementation Team

FGR – flue gas recirculation

FHA – fault hazard analysis

FLAME – Fire Laboratory for the Authentication of Models and Experiments

FMEA – failure modes and effects analysis

FONSI – finding of no significant impact

FPAC – firing pad access control

fpm – feet per minute

fps – feet per second

FREC – fuel ringed external cavity

FSID – Facilities and Safety Information Document

FSU – Former Soviet Union

ft – foot or feet

ft^3 – cubic foot

FTE – full-time equivalent

FY – fiscal year

g – gram(s)

g – gravitational acceleration

gal – gallon(s)

GIF – Gamma Irradiation Facility

GPS – Global Positioning System

GRUMP – General Repetitive Universal Multi-Purpose (pulser)

GWPP – Groundwater Protection Program

HA – hazards analysis

ha – hectare(s)

HARP – Hazard Aggregation Rollup Process

HC – hazard category

HCF – Hot Cell Facility

HCPI – Hazardous Chemicals Purchase Inventory

HEPA – high-efficiency particulate air (filter)

HERMES III – High-Energy Radiation Megavolt Electron Source III

HMX – octohydrotetranitrotetrazocine

HNAB – hexanitrostilbene

HPGe – high-purity germanium

HVAC – heating, ventilation, and air conditioning

HWMF – Hazardous Waste Management Facility

Hz – hertz

I - iodine

IBEST – ion beam surface treatment

ICF – inertial confinement fusion

ICS – instrumentation and control system

IEEE – Institute of Electrical and Electronics Engineers

IDLH – immediately dangerous to life and health

IGSV – In-Ground Storage Vault

IHE – insensitive high explosives

IMP – Intermediate Pulser

IMRL – Integrated Materials Research Laboratory

in. – inch(s)

ISMS – Integrated Safety Management System

IST – initial source terms

IWFO – Intelligence Work for Others

J – joule(s)

KAFB – Kirtland Air Force Base

k – kilo- (prefix for one thousand)

l – liter(s)

lb – pound(s)

LARPS – Large Aircraft Robotic Painting System

LENSTM – laser engineered net shaping

LEVIS – laser evaporation ionization source

LEWS – lightening early warning system

LIBORS – laser ionization based on resonant saturation (system)

LICA – low-intensity cobalt array

LIHE – Light Initiated High Explosive

LIVA – linear induction voltage adder

LLMW – low-level mixed waste

LLW – low-level waste

LMPL – Liquid Metal Processing Laboratory

LPF – leak path factor

LTCC – low-temperature co-fired ceramic

LWDS – Liquid Waste Disposal System

m – meter(s) or milli- (prefix for 10^{-3}, or one-thousandth)

μ - micro- (prefix for 10^{-6}, or one-millionth)

M – mega- (prefix for 10^{6}, a millionfold) or million

MA – mega-ampere(s)

MACCS – MELCOR Accident Consequence Code System

MCL – maximum contaminant levels

MCM – multi-chip modules

MDL – Microelectronics Development Laboratory

MEI – maximally exposed individual

MESA – Microsystems & Engineering Sciences Applications (Complex)

mi – mile(s)

MIPP – Medical Isotopes Production Program

MITE – magnetically insulated transmission experiment

MITL – magnetically insulated transmission line

mm – millimeter(s)

Mo - molybdenum

MOCVD – metallorganic chemical vapor deposition

MPC – microsecond pulse compressor

mrem – millirem(s)

MSDS – material safety data sheet

MTA – Marx trigger amplifier

MTG – Marx trigger generator

MTRU – mixed transuranic

MUSE – multidimensional, user-oriented synthetic environment

MV – megavolt(s)

MW – megawatt(s)

MWL – Mixed Waste Landfill

NAGPRA - Native American Graves Protection and Repatriation Act of 1990 (NAGPRA)

NASA – National Aeronautics and Space Administration

NEC – National Electrical Code

NEPA – National Environmental Policy Act

NESHAP – National Emission Standards for Hazardous Air Pollutants

NEST – Nuclear Emergency Search Team

NFA – no further action

NFPA – National Fire Protection Association

NG – nitroglycerin

NGF – Neutron Generator Facility

NHZ – nominal hazard zone

NIF – National Ignition Facility

NMAC – New Mexico Administrative Code

NMED – New Mexico Environment Department

NO_x – nitrogen oxide(s)

NN – nonnuclear

NRC – Nuclear Regulatory Commission

NRU – neutron radiography unit

NSA – National Security Agency

NSTTF – National Solar Thermal Test Facility

ODMS – oxygen deficiency monitor system

OP – operating procedure

O&SHA – operating and support hazard analysis

OSHA – Occupational Safety and Health Administration

PADI – Professional Association of Diving Instructors

PBFA – Particle Beam Fusion Accelerator

PBX – plastic bonded explosives

PCB – polychlorinated biphenyl

PCE – tetrachloroethene

PDFL – Photovolataic Device Fabrication Laboratory

Pe – probability of event occurring per year

PETL – Processing and Environmental Technology Laboratory

PETN – pentaerythritol tetranitrate

PFL – pulse-forming lines

PHS – primary hazard screening

pico (or p) – prefix for one-trillionth (10^{-12})

PKID – point kinetics, one-dimensional (thermal analysis code)

PMMA – polymethyl methacrylate

ppm – parts per million

PPS – plant protection system

PQL – practical quantitation limit

psi – pounds per square inch

PV – photovoltaic

R – roentgen (unit of absorbed radiation dose exposure)

R&D – research and development

rad – radiation absorbed dose

RCF – refractory ceramic fiber

RCRA – Resource Conservation and Recovery Act of 1976

TCSC – Radiological and Criticality Safety Committee

RCT – radiological control technician

RDX – hexahydrotrinitrotriazine

RF – radio frequency

RGD – radiation-generating device

RHEPP – Repetitive High-Energy Pulsed Power

RITS – Radiographic Integrated Test Stand

RMMA – radioactive material management area

RMWMF – Radioactive and Mixed Waste Management Facility

RO/DI/UPW – reverse osmosis deionized ultra pure water

ROD – record of decision

RP – rapid prototyping

rpm – revolutions per minute

RTP – Repetitive Test Pulser

RTV – room-temperature vulcanize

s – second(s)

SABRE – Sandia Accelerator and Beam Research Experiment

SA – safety assessment

SAD – safety assessment document

SAR – safety analysis report

SCB – steel confinement box

scf – standard cubic feet

SDI – Strategic Defense Initiative

SER – safety evaluation report

SF_6 – sulfur hexafluoride

SGB – shielded glove box

SHA – system hazard analysis

SIH – standard industrial hazard

SL – stereolithography

SNL – Sandia National Laboratories

SNL/NM – Sandia National Laboratories/New Mexico

SNM – special nuclear material

SOP – standard operating procedure

SPHINX – Short-Pulse High Intensity Nanosecond X-Radiator

SPR – Sandia Pulsed Reactor

STAR – Shock Thermodynamics Applied Research Facility

STB – steel transfer box

STF – Subsystem Test Facility

STP – storage/transfer pool

SVOC – semi-volatile organic compounds

SWEIS – site-wide environmental impact statement

SWISH – small wind shield

SWMU – solid waste management unit

T&E – threatened and endangered

TA – Technical Area

TAG – Tijeras Arroyo Groundwater (Investigation)

TATB – triaminotrinitrobenzene

Te - technetium

TCE – trichloroethene

TEDE – total effective dose equivalent

TESLA – Tera-Electron Volt Energy Superconducting Linear Accelerator

TNT – trinitrotoluene

TOX – total halogenated organics

TRU – transuranic

TSCA – Toxic Substances Control Act

TSPI – Time-space-position information

TSR – Technical Safety Requirement

TTF – Thermal Treatment Facility

TW – terawatt(s)

UGT – Underground Test (Program)

UL – Underwriters Laboratory

UNO – United Nations Organization (hazard classification and compatibility group)

USAF – U.S. Air Force

USQ – unreviewed safety question

UV – ultraviolet

V – volt(s)

VDL – vacuum diode load

VIS – vacuum insulator stack

VMAS – virtual manufacturing applications system

VOC – volatile organic compounds

VR – virtual reality

W - watt

WFO – Work for Others (Program)

Xe - xenon

YAG – yttrium aluminum garnet

yr - year

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CHAPTER 1.0
INTRODUCTION

CONTENTS

FIGURES

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SNL/NM FY2001 SWEIS ANNUAL REVIEW

1.0 INTRODUCTION

In late 1999, the U.S. Department of Energy (DOE) published the Sandia National Laboratories/New Mexico (SNL/NM) Site-Wide Environmental Impact Statement (SWEIS) examining the environmental impacts of three alternatives for the continued operation of the facility (DOE, 1999). To complete the *National Environmental Policy Act* (NEPA) process, DOE issued a Record of Decision (ROD) identifying the expanded operations alternative for assessing the projected impacts of operating SNL/NM for the future (DOE, 2000). The DOE's NEPA-related regulations call for the agency to evaluate the SWEIS at least every 5 years to determine whether it remains adequate, if a new SWEIS should be prepared, or if a supplement to the existing SWEIS is needed (10 CFR 1021.330). Consistent with this requirement, the SWEIS would be assessed sometime in 2004.

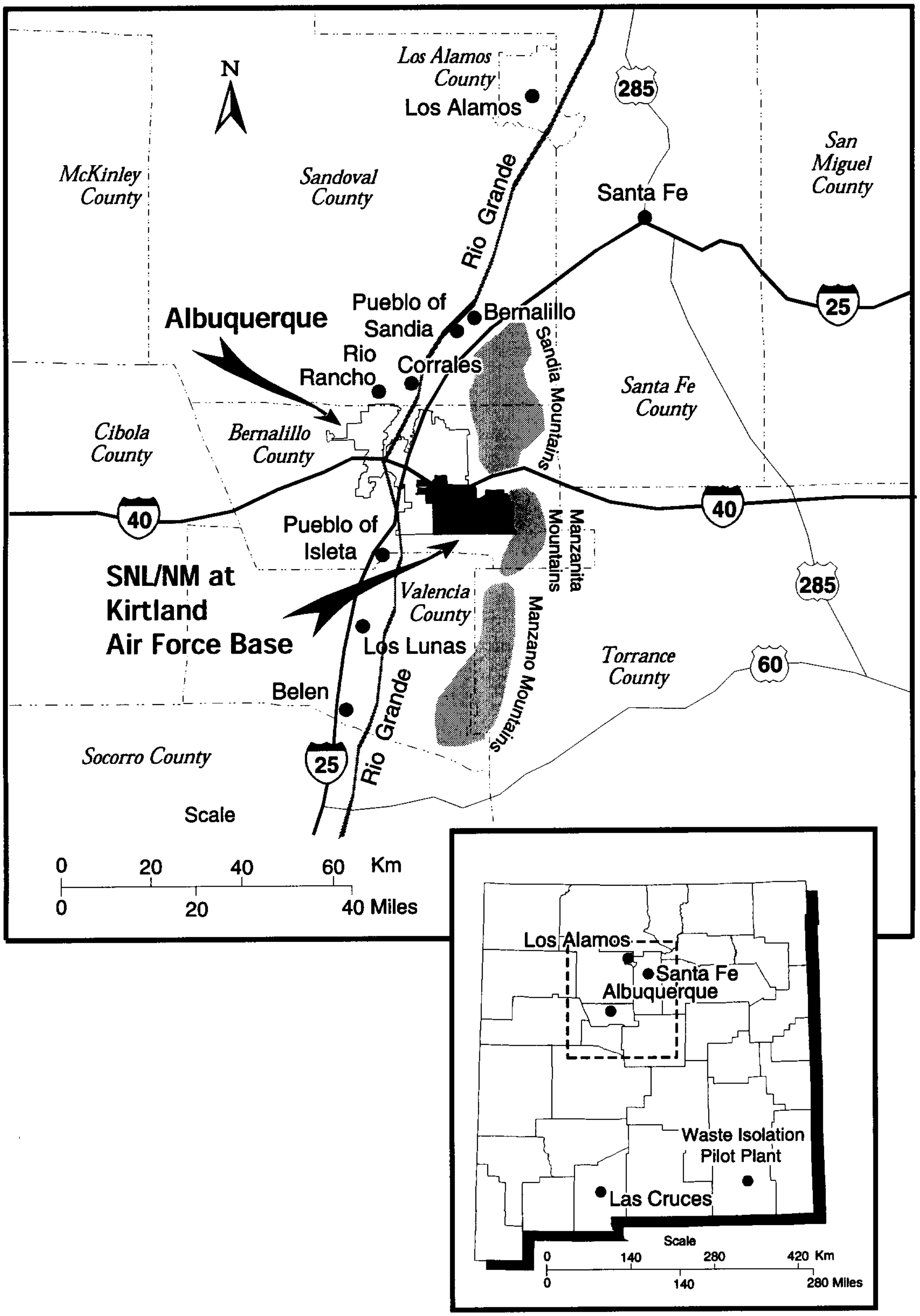
A majority of baseline information collected for the SWEIS (which began preparation in 1998) was representative of SNL/NM operations during fiscal years (FYs) 1996 and 1997; some estimates of projected operations for 5 years (2003) and 10 years (2008) began with data available for 1998. In conjunction with DOE's release of the SWEIS, SNL/NM published much of the SWEIS source data and information collected and published in the SNL/NM Facilities and Safety Information Document (FSID) and the Environmental Information Document (EID) (SNL, 1999a, b).

The information on the environmental impacts of operating SNL/NM up to the expanded operations level of activities established a bounding environmental impacts framework to compare future activities. A comparison of changes in FY2001 SNL/NM activities to the expanded alternative activities analyzed in the SWEIS is included in this FY2001 Annual Review. This comparison provides DOE with an annual measurement about how SNL/NM operations fit within the overall SWEIS impact analysis. Figure 1-1 shows the overall site in relation to Bernalillo County, New Mexico, the Albuquerque region, and the adjacent offsite features.

SNL/NM facilities designated as "Notable," including the group of "Selected Facilities," collectively account for almost all of the program-related environmental impacts associated with:

- Risks of radioactive or hazardous substances to the environment.
- Hazards in the workplace.
- Potential for impacts on land not owned by DOE.

Figure 1-1. SNL/NM in Relation to Bernalillo County, New Mexico, the Albuquerque Region, and Adjacent Offsite Features



1.1 SWEIS Alternatives and Analysis

As described in the SWEIS and its ROD, DOE proposes to continue operating SNL/NM and managing its resources in a manner that meets evolving DOE missions and that responds to the concerns of affected and interested individuals and agencies (DOE, 1999, 2000). In the SWEIS, DOE identified three alternatives—Reduced Operations, No Action, and Expanded Operations (DOE's Preferred Alternative)—that would meet its purpose and need for agency action and would support existing and potential future program-related activities at SNL/NM.

Under the reduced operations alternative, DOE and interagency programs and activities at SNL/NM were analyzed at the minimum level of operations needed to maintain SNL/NM facilities and equipment in an operational readiness mode. Under the no action alternative, ongoing DOE and interagency programs and activities at SNL/NM were analyzed to continue the status quo, that is, operating at planned levels as reflected in current DOE management plans.

Under the expanded operations, the preferred alternative, DOE and interagency programs and activities at SNL/NM were analyzed to increase to the highest reasonable activity levels that could be supported by current facilities, their potential expansion, and construction of new facilities for future actions specifically identified in the SWEIS. Environmental impacts analyzed under this alternative provided a bounding analysis of potential environmental impacts from SNL/NM operations until these operations would increase beyond the bounding operations projections.

1.2 Goals of the SWEIS Annual Review

The primary goal of the SWEIS Annual Review is to track annual changes or modifications to SNL/NM facilities and operations and the related environment associated with these changes. In support of this goal, the Annual Review provides information on SNL/NM activities by:

- Compiling and reporting the major modifications of SNL/NM operations in the context of environmental impacts analyzed in the SWEIS (DOE, 1999).

- Providing SNL/NM and DOE with information on trends and issues related to changes in environmental impacts associated with SNL/NM operations.

1.3 The Scope of the SWEIS Annual Review

Information presented in the FY2001 SWEIS Annual Review is drawn primarily from available SNL/NM databases and reports collected yearly or according to established reporting schedules. This approach minimizes the burden to ongoing research and development activities and aids in controlling the costs associated with collecting, validating, and reporting data. Additional data required to support extensive, detailed environmental impact assessment and modeling, such as accident risk analysis and transportation data, is expected to be collected at the time DOE prepares an analysis on the status of the SWEIS (possibly in 2004 or 2005).

1.4 SWEIS Annual Review Information

The SWEIS Annual Review is organized to provide the following FY2001 environmental information:

- Chapter 2 provides an update of FY2001 SNL/NM total site-wide operations reported in the SWEIS, including aggregated data such as total SNL/NM workers, total payroll and expenditures, annual worker and public radiation doses, utility usage, air emissions, water consumption and wastewater discharge, and similar information that can be compared to the SWEIS and its ROD (DOE, 1999, 2000).

- Chapter 3 provides a summary of additions and modifications in FY2001 SNL/NM operations, with an update of selected and notable facility operations during the same period. This information is presented in an extended table, where types of operations refer to the facility capabilities described in the SWEIS and FSID, and levels of operation are expressed in units of production, number of tests, number of accelerator shots, hours of operation, and similar descriptive units of measurement (DOE, 1999; SNL, 1999a).

- Chapter 4 provides more specific reports of FY2001 operations data for selected facilities compared to projected data for the SWEIS expanded operations alternative. The data for each facility includes material usage, waste generated, air emissions, process requirements (i.e., process water, process electricity, and boiler needs), and number of workers.

- Chapter 5 provides more specific reports of FY2001 operations data for notable facilities compared to projected data collected for the SWEIS analysis. This information includes current operations and capacities and a summary of FY2001 operations.

- Appendix A provides a summary of activities and hazards associated with SNL/NM individual general, special, and highbay laboratories with new Primary Hazard Screening forms prepared since the publication of the FSID and the SWEIS.

- Appendix B provides a summary of SNL/NM chemical usage (chemicals of concern identified in the SWEIS), including changes in hazardous chemical use and quantities.

CHAPTER 2.0
SUMMARY OF FY2001
SITE-WIDE OPERATIONS AT SNL/NM

CONTENTS

TABLES

2.0 REVIEW OF SNL/NM SITE-WIDE FY2001 OPERATIONS

Published by the U.S. Department of Energy (DOE) in 1999, the SNL/NM Site-Wide Environmental Impact Statement (SWEIS) analyzed the potential direct, indirect, and cumulative environmental impacts of continuing to operate SNL/NM in three alternative modes of operation. The three modes analyzed included a no-action alternative, a reduced operations alternative, and an expanded operations alternative (DOE, 1999). Within the SWEIS, the detailed impact analysis was specific to SNL/NM's major "selected" facilities. The more general site-wide analysis was limited to resource and issue areas that allowed an overall operational rollup and analysis. In nearly all cases, the consequence analysis of potential site-wide impacts focused on potential impacts to human health, air quality, water quality and quantity, and biological resource issues.

Although this chapter focuses on FY2001 operations data rolled up for all of SNL/NM, in a few cases, it also includes information on specific impacts, e.g., worker doses from radioactive air emissions or other sources. Because SNL/NM routinely assesses these impacts, using standard methodologies that were also used in the SWEIS, this information can be compared to baselines and projections included in the SWEIS. A number of other operations parameters, such as material inventories or material usage, however, are not included in the Annual Review, because these data are not routinely collected by SNL/NM and would require a specific data collection effort and analysis more appropriate for when the SWEIS would be reassessed (possibly in 2004 or 2005).

Information included here compares actual FY2001 operating data from eleven resource areas to projected activities (and associated impacts) analyzed in the SWEIS. These resource areas include land use, infrastructure, geology and soils, water resources and hydrology, biological and ecological resources, cultural resources, air quality, human health and worker safety, transportation, waste generation, and socioeconomics. Specific resource areas are presented with the following details:

- Infrastructure includes information on water use, electrical consumption, and wastewater.
- Air quality includes information on criteria pollutants, hazardous air pollutants, and radiological emissions.
- Waste generation includes information on hazardous waste, mixed waste, and solid waste.
- Socioeconomics includes information on the number of employees and total budget.

2.1 Land Use

In FY2001, SNL/NM land use designations within Kirtland Air Force Base (KAFB) remained essentially the same as those discussed in the SWEIS. During the year, DOE signed a 99-year lease renewal with the State of New Mexico Land Office for use of a 2,750-acre (ac) (1,113-hectare [ha]) buffer zone along the western boundary of KAFB. This buffer zone, known as La Semilla, provides margins of safety and sound buffers for SNL/NM testing activities at the 10,000-Foot Sled Track. Negotiations also continued during FY2001 for the renewal of another buffer zone lease, with the Pueblo of Isleta, encompassing 6,346 ac (2,570 ha) near the southwestern boundary of KAFB.

2.1.1 La Semilla Buffer Zone

The La Semilla buffer zone is bordered by KAFB on the north and east, the Pueblo of Isleta reservation on the south, and the planned Mesa del Sol residential development on the west. The buffer zone is located on approximately 2,750 ac (1,113 ha) of land held in trust by the

State of New Mexico Land Office for the benefit of the University of New Mexico.

Planned use of the buffer zone would include hiking and biking trails connecting different areas. There are also plans for a renewable resource research park, an environmental education campus, a native plant garden and arboretum, a wildlife rehabilitation center and rangeland, and reclamation research areas.

The primary role of La Semilla is to act as a buffer between the military base and Mesa del Sol. DOE has leased the property in the past to minimize impacts to any future residential uses that would be exposed to the sounds and vibrations common to Sled Track operations.

(SNL, 2001a)

2.1.2 Isleta Pueblo Buffer Zone

The Isleta Pueblo is adjacent to the south boundary of KAFB. For many years, DOE has leased 6,346 ac (2,570 ha) from the Pueblo to provide a safety buffer zone for the 10,000-Foot Sled Track in Tech Area III (TA-III). During FY2001, DOE and SNL/NM continued to assess future testing requirements and the need to renew the lease for this buffer zone, but no actions were taken to actually renew the lease.

(SNL, 2001a)

2.1.3 Manzano Storage Facility

DOE has obtained land-use permits from the U.S. Air Force (USAF) for SNL/NM to use numerous bunkers at the Manzano Storage Facility. SNL/NM continued to use the leased bunkers in FY2001 primarily for the storage of hazardous material and waste.
(SNL, 2001a)

2.1.4 Land-Use Permits

The USAF has granted numerous land-use permits to DOE for SNL/NM use of Air Force or Air Force-controlled properties within KAFB. These land-use permits are usually limited to 5 years, but in a few cases, can extend up to 25 years in length. In FY2001, the DOE requested, in support of SNL/NM programs, a total of six project-related modifications to existing land-use permits, three new land-use permits, one land-use permit renewal, and one termination of a land-use permit from the USAF.

2.2 Infrastructure

SNL/NM's infrastructure includes facilities and systems for water, sanitary sewer, storm drain, steam, chilled water, electrical transmission, electrical distribution, communications, roads, and parking that support the TAs and those facilities located on property permitted from the USAF. According to the FY2001-2010 Sites Comprehensive Plan's "Supplemental Information," infrastructure-related systems capacities in FY2001, including maintenance, roads, communications, steam, natural gas, and facility decommissioning, remained well within expected SWEIS utility projections, including water use, wastewater, electricity, and natural gas (see Table 2-1) (SNL, 2001a, 2002a).

2.2.1 Natural Gas

There have been no changes in the natural gas distribution system since publication of the SWEIS. Table 2-1 presents natural gas usage by SNL/NM in FY2001, and steam generation continued to be the major use. The total gas consumption for FY2001 was just below the usage analyzed in the SWEIS baseline (DOE, 1999). The Steam Plant produced 529 million pounds (M lb) of steam in FY2001.

(Wrons, 2002)

2.2.2 Electricity

SNL/NM is supplied with electrical power through a contract with the Public Service Company of New Mexico. Table 2-1 shows the SWEIS baseline and expanded use of electricity compared to the FY2001 electrical usage of 207,000 kilowatt-hours. The FY2001 total usage represents 95 percent of estimated total annual usage analyzed under the SWEIS expanded operations alternative (DOE, 1999).

2.2.3 Water

SNL/NM is supplied with water through KAFB wells, with additional supplies provided during peak demands by the City of Albuquerque. Table 2-1 shows the SWEIS baseline and expanded water use compared to the FY2001 water use of 342M gallons (gal) (1.29 billion liters [B l]). This is 153M gal (579M l) below the quantity analyzed in the SWEIS expanded operations alternative. The FY2001 total usage represents 69 percent of estimated total annual usage analyzed under the SWEIS expanded operations alternative.

(Rogers, 2002)

2.3 Geology and Soils

For the Environmental Restoration (ER) Project, the SNL/NM SWEIS discussed 182 locations of potential soil contamination on DOE and KAFB properties resulting from past SNL/NM activities. Since publication of the SWEIS, 20 subsite locations were added to the original 182 locations, for a total of 202 locations. Of these, 122 have been proposed to the New Mexico Environment Department (NMED) as requiring no further action (NFA) because no contamination was found, or contaminant levels were below risk- or regulatory-based criteria, or cleanup has been completed. For the SWEIS baseline year (1996) only 48 sites had received approved NFAs. By September 2000, the total of NFA approvals reached 81. Investigation or cleanup continues at the remaining 41 sites.

SNL/NM Department 6135, Environmental Restoration (ER), proposes to locate a Global Positioning System (GPS), and characterize buried drain and septic system components at approximately 61 newly created ER Solid Waste Management Unit (SWMU) sites. The proposed work would be carried out in three phases.

In FY2000, the ER Project began the transition from cleanup and disposal operations to long-term stewardship responsibilities for monitoring and maintenance operations. As stewardship begins, the number of NFA approvals is expected to decline because stewardship would involve long-term management activities. Completion of ER Project work is scheduled for 2004, but the final schedule is dependent upon funding and regulatory approval.

(Freshour, 2002)

2.4 Water Resources and Hydrology

Groundwater beneath KAFB occurs primarily in the Albuquerque-Belen Basin aquifer, currently the sole source of drinking water for Albuquerque and surrounding communities. Depth to groundwater ranges from 400 feet (ft) to 500 ft (122 meters (m) to 152 m) for the SNL/NM TAs. Basin-wide groundwater levels have been decreasing for more than 30 years, the result of groundwater withdrawal by municipal and private wells exceeding the rate of groundwater recharge. In 2001, KAFB withdrew 1.38B gal (5.2B l) of groundwater, of which SNL/NM used 342M gal (1.29B l) (Rogers, 2002). Water levels in almost all regional wells across KAFB continued to decline in FY2001. A prominent water-level depression is present on the west side of KAFB, with water-level declines up to 1.6 ft (0.5 m) per year.

2.4.1 General Site Groundwater Sampling

During FY2001, groundwater samples were collected and analyzed by the Groundwater Protection Program (GWPP) and the ER Project quarterly, biannually, or annually, from 67 monitoring wells. Results from both groups were compared to maximum contaminant levels (MCLs) established by the U.S. Environmental Protection Agency (EPA), and derived concentration guides (DCGs) for radionuclides, established by DOE.

Annual Groundwater Sampling

Annual sampling was conducted in a total of 13 wells and one spring in FY2001, including five Mixed Waste Landfill (MWL) ER Project wells. Analyses were conducted for metals, volatile organic compounds (VOCs), inorganics (including nitrate and cyanide), phenolics, alkalinity, total halogenated organics (TOXs), perchlorate, gross alpha, gross beta, and radionuclide activities. The sample from the Explosives Ordnance Disposal (EOD) Hill well exceeded the gross alpha MCL of 15 picocuries per liter (pCi/l). The elevated gross alpha concentrations are due to natural conditions associated with the geology at this site and are not the result of contamination caused by activities conducted at KAFB.

MWL annual groundwater sampling was conducted in five wells in April 2001. No analytes were detected above MCLs. Nickel and chromium concentrations slightly exceeded NMED established background concentrations. The nickel and chromium are attributed to corrosion of stainless-steel well screens.

(SNL, 2002b)

Biannual Groundwater Sampling

Biannual sampling was conducted at 10 Chemical Waste Landfill (CWL) monitoring wells. Analysis was conducted for Appendix IX metals and VOCs (40 CFR 264). At the request of the NMED, additional samples were collected from CWL-MW2A and CWL-MW4 and analyzed for perchlorate. There were no analytes detected above established MCLs in any CWL well. Trichloroethene (TCE) was detected below the MCL of 5.0 micrograms per liter (µg/l) at concentrations ranging from 0.13 µg/l to 2.44 µg/l. No metals were detected above laboratory practical quantitation limits (PQLs), except for barium, cobalt, iron, nickel, selenium, silver, thallium, and zinc. Perchlorate was not detected above laboratory PQLs in any groundwater sample.

Quarterly Groundwater Sampling

Quarterly sampling was conducted at nine wells in FY2001. Analytes included VOCs, metals, nitrate, perchlorate, and radionuclide activities. TCE has consistently been detected in one well (LWDS-MW1) at levels up to four times the MCL of 5 µg/l. The most likely source of the TCE is the drain field for the Liquid Waste Disposal System (LWDS). Nitrate levels are also elevated in LWDS-MW1 and two other wells (AVN-1 and AVN-2). LWDS-MW1 had the highest level with 19 milligrams per liter (mg/l), as compared to the MCL of 10 mg/l.

2.4.2 Tijeras Arroyo Groundwater (TAG) Investigation Area Sampling

Wells in the TAG Investigation area are completed either in the regional aquifer or a localized shallow groundwater system. Thirteen shallow groundwater system wells and twelve regional monitoring wells were sampled quarterly in FY2001. TCE has been identified in both shallow and regional wells at levels slightly above the MCL of 5.0 µg/l. The highest level of 8.7 µg/l was found in TA2-W-26 during the January 2001 sampling event. Tetrachloroethene (PCE) has also been found in TA-W-26 samples at levels slightly above the MCL of 5.0 µg/l. The highest level of 6.1 µg/l was found during the September/October 2001 sampling event. Nitrate is also a contaminant of concern in the TAG Investigation, and samples from seven wells showed elevated nitrate levels. In the September/October 2001 sampling event, TJA-7 had a nitrate level of 41 mg/l, as compared to the MCL of 10 mg/l. Thallium was found in one shallow groundwater system well (TA2-W-26) at levels up to 4.22 µg/l, as compared to the MCL of 2 µg/l.

The TAG Investigation area, which presently includes SNL/NM's Tech Areas I and II, has a long history of industrial tenants that have occupied the area prior to SNL/NM's presence. Past SNL/NM operations have also had the potential to contaminate the groundwater. Currently, the source of contaminants, such as TCE, has not been identified. Due to the complex nature of potential past contaminant scenarios, the source of groundwater contaminants may never be definitively identified.

2.4.3 Coyote Canyon Test Area Groundwater Sampling

Groundwater sampling in the Coyote Canyon Test Area was conducted for three quarters of FY2001 at three monitoring wells and one production well onsite. This area includes the general vicinity associated with the active Burn Site Facility in Lurance Canyon. The Burn Site Facility conducts thermal tests using jet fuel, gasoline, and diesel. Low levels of petroleum products and other VOCs have been detected in two of the three monitoring wells onsite. Other analytes included semi-volatile organic compounds (SVOCs), explosives, metals, phenolics, and various anions, including nitrate. Nitrate has been detected consistently in two wells. The highest level found was 22 mg/l, as compared to the MCL of 10 mg/l. All petroleum products detected have been at trace levels, where established. Ethyl benzene was detected at less than 1 µg/l, as compared to MCL of 700 µg/l; toluene was detected at less than 1 µg/l, as compared to MCL of 1,000 µg/l; and xylene was detected at less than 2 µg/l, as compared to the MCL of 10,000 µg/l.

(SNL, 2002b)

2.5 Biological/Ecological Resources

Continued long-term restricted access and limiting planned development have generally provided protection, benefiting biological resources within the boundaries of KAFB. This benefit continued in FY2001, with no identified threatened and endangered (T&E) species issues at SNL/NM.

Grassland vegetation in open areas of KAFB, the Albuquerque International Sunport, and SNL/NM provides habitat for Gunnison's prairie dog (*Cynomys gunnisoni*) and subsequently for the western burrowing owl (*Athene cunicularia hypugea*). Although the western burrowing owl is not a T&E species, it is a migratory, nongame bird protected under the *Migratory Bird Treaty Act*.

Current management practice regarding prairie dogs is conservation of their habitat for later use by burrowing owls. Conservation efforts are also underway with the State of New Mexico to protect the black-tailed prairie dog (*Cynomys ludovicianus)* as a candidate for federal T&E listing. To date, however, routine biological surveys have not identified this species within KAFB boundaries.

In all areas where potential ground disturbance is proposed, i.e., construction, renovation, or decommissioning activities, SNL/NM performs surveys to detect resident prairie dogs, burrowing owls, and other migratory birds. To reduce the impacts to prairie dogs from construction, SNL/NM makes an effort to stimulate relocation of prairie dog populations by a light grading of the ground surface prior to major ground disturbance. Once the ground cover is removed, the prairie dogs seek a new area of habitation. Burrowing owl nests are avoided as much as possible, or if necessary, the birds can be relocated by qualified handlers to an undisturbed area.

In FY2001 and preceding years, SNL/NM conducted annual ecological monitoring studies at various SNL sites throughout the Kirtland Federal Complex (KFC) for sensitive species. This monitoring has included 15 to 20 surveys each summer for the western burrowing owl.

An inventory of biological and ecological resources compiled for preparation of the

SWEIS is included the SNL/NM Environmental Information Document (EID) (SNL, 1999b). The SNL/NM Annual Site Environmental Report (ASER) provides environmental compliance summaries (SNL, 2002c). Processes and procedures directing the management of sensitive species and habitat are included in the SNL Environment, Safety & Health Manual (SNL, 2002d).

2.6 Cultural Resources

There are 284 recorded prehistoric and historic archaeological sites within the boundaries of KAFB and the associated buffer zones. The prehistoric archaeological sites include some that date to before AD 1540 (the initiation of Spanish exploration of the area); the historic archaeological sites include sites, buildings, and structures dating from AD 1540 to 1948.

Cultural resources in areas used by SNL/NM continue to benefit from the protection provided by restricted access, compliance with applicable regulations, and established procedures for the protection and conservation of these resources. There are no known cultural resource sites on DOE-owned land within KAFB. To date, no traditional cultural properties have been specifically identified within SNL/NM Technical Areas; however, several tribes have requested that they be consulted under the *Native American Graves Protection and Repatriation Act* of 1990 (NAGPRA) if human remains were to be discovered during excavations related to SNL/NM activities.

During FY2001, several consultations were initiated between DOE and SNL/NM with the New Mexico State Historical Preservation Officer (SHPO) on the potential historical significance of buildings and structures located within SNL/NM Technical Areas. DOE and SNL/NM consulted with the SHPO on a total of 81 buildings during 2001.

2.7 Air Quality

2.7.1 Radiological Air Quality

Radioactive airborne emissions from point sources (i.e., stacks) during FY2001 totaled ~20.70 curies (Ci), less than the 19,311 Ci analyzed in the SWEIS expanded operations alternative. The two largest contributors were the Neutron Generator Facility (NGF) and the Annular Core Research Reactor (ACRR). The NGF stack emissions totaled 4.2 Ci and accounted for ~20 percent of the SNL/NM total, but were less than the projected level for expanded operations of ~156 Ci for tritium. Emissions from the ACRR were ~16.2 Ci, and accounted for 78 percent of the SNL/NM total. The emissions represent 208 percent of the projected level for expanded operations of 7.8 Ci/yr for this selected facility. The rise in the ACRR's estimated release was due to increased operational requirements for the reactor. Other sources of radioactive air emissions were present at four other primary facilities located throughout SNL/NM. There were two primary National Emission Standards for Hazardous Air Pollutants (NESHAP) source facilities that reported zero emissions. In CY2001, the eight primary radionuclide air-emission sources at SNL/NM used to calculate dose estimates to the public were:

- ACRR, Defense Programs (DP) configuration
- NGF
- Sandia Pulsed Reactor (SPR)
- Hot Cell Facility (HCF)
- Z Accelerator
- Radioactive and Mixed Waste Management Facility (RMWMF)

- Chemical Waste Landfill (CWL)
- Mixed Waste Landfill (MWL)

The criterion for a facility to be a primary NESHAP source is that the facility is required to perform some form of measurement to determine its production rate of airborne radioisotopes; the result is that the primary list will vary from year to year. Annual radionuclide air-emission estimates for the primary sources are made using one of the following methods:

- Continuous stack monitoring, such as at the NGF and the RMWMF.
- Periodic measurements of the radionuclide production rate, multiplied by the annual facility energy output or shot history, such as at the ACRR and SPR.
- Measurements of radionuclide concentrations in soils or facilities, multiplied by a conservatively high estimate of the release fraction, such as at the CWL.

The ACRR, medical isotopes production configuration, was removed from the list, since the production of molybdenum-99 (Mo-99) is currently in suspension.

The High-Energy Radiation Megavolt Electron Source III (HERMES III) was removed from the primary NESHAP source list as of CY2001, because it was determined that confirmatory emissions measurements had been performed for a sufficient length of time to adequately characterize the radionuclide production rate in the facility. In addition, the dose to the public resulting from HERMES III emissions has consistently been a small fraction of the overall dose from all Sandia emissions sources (less than 0.01 percent of the total SNL/NM dose).

The Z Accelerator was added to the NESHAP list with the start of experiments involving the irradiation of deuterium targets, resulting in the production and emission of tritium. The tritium emissions have been conservatively estimated based on measured parameters within the facility, thus it was categorized as a primary source.

The Radiographic Integrated Test Stand (RITS) is not on the primary source list because, although installation of the accelerator began in FY2001, the facility is not expected to be fully operational until 2003 or later.

The Explosive Components Facility (ECF) was included in the SWEIS analysis in expectation of a scope of operations that was never realized, and therefore is not included in the current NESHAP source list.

The CWL was added to the NESHAP source list because the levels of radioactivity in the soil and in the landfill were higher than originally anticipated. Emissions estimates are possible based on measured radionuclide concentrations in soil and the use of a conservative release fraction. The resulting public dose from CWL radionuclide emissions was determined to be a relevant fraction of the total SNL/NM dose (~1 percent); also, the project continued longer than originally projected.

(Eckstein, 2002a; Oldewage, 2002; Martin, 2002)

The calculated dose to the maximally exposed individual (MEI) by the air pathway during 2001 was 3.0×10^{-3} millirem (mrem), including contributions from stack emissions and non-point sources such as the MWL and the CWL. The calculated MEI dose attributable to SNL/NM operations was less than 0.6 percent of the 0.51 mrem projected by the SWEIS and its Record of Decision, and is well below the EPA emission standard of 10 mrem/yr (DOE, 1999, 2000). The calculated collective dose to the population within a 50-mile (mi) (80-kilometer [km]) radius of SNL/NM from the annual radiological air emissions due to SNL/NM operations was 6.82×10^{-2} person-rem and would be 15.8 person-rem per year under the expanded operations alternative.

(Eckstein, 2002a)

2.7.2 Nonradiological Air Quality

Major sources of nonradiological air emissions in the Albuquerque area are motor vehicles, wood-burning stoves and fireplaces, and open burning. Besides Albuquerque motor vehicle commuting, the largest contribution to air emissions at SNL/NM are the Steam Plant boilers which provide heat to a large number of SNL/NM facilities. The Steam Plant continues to account for more than 90 percent of the total SNL/NM emission of pollutants from fixed facilities regulated by the *Clean Air Act.* All SNL/NM emissions, however, remain below regulatory permitted levels, and are below standards set to protect health, with an ample margin of safety. Hazardous chemical air emissions related to SNL/NM activities are so small as to not require individual facility air quality monitoring. Even so, SNL/NM continues to reduce and limit chemical air emissions through improved administrative and engineering controls whenever possible.

Vehicle emissions, the dominant source of carbon monoxide (CO) from SNL/NM activities, are assessed because the Albuquerque/Bernalillo county area is an EPA-designated "maintenance" area for this emission. All other sources of CO at SNL/NM remain small. In fact, the total CO emissions associated with SNL/NM activities are estimated to be ~3 percent of the total CO emissions generated in the county.

A summary of emissions of criteria pollutants and other pollutants for FY2001 appears in Table 2-1. Compared to the quantities analyzed in the SWEIS expanded operations alternative, except for CO and sulfur dioxide, all hazardous emissions were lower in FY2001. In fact, nitrogen oxides (NO_x) were down significantly, from 153.92 tons/yr to 29 tons/yr. The sulfur dioxide emissions were increased due to high natural gas prices in the winter of FY2001; more diesel oil was burned at the Steam Plant than in previous years. Because neither KAFB nor SNL/NM performed vehicle counting during FY2001 to develop estimated daily traffic activity related specifically to SNL/NM operations, an estimate of CO emissions from commuter traffic is not available. However, because the number of full-time employees at SNL/NM in FY2001 (6,812) remained well below the estimated employee population under the SWEIS expanded operations alternative (8,417), it can be assumed that CO emissions from commuter vehicles would remain under the annual total estimated for this alternative of 3,837 tons per year. This would be the case even if contractor employees and students were added to the total base year and expanded operations alternative estimates. In addition, the SWEIS projected that SNL/NM would be able to reduce mobile CO emissions by 250 tons per year through improvements in its fleet vehicle operations. Details on SNL/NM chemical purchases for FY2001 are included in Appendix B. Purchase estimates for chemicals of concern are presented in categories of air pollutants, including hazardous, toxic, and volatile organic compounds.

(du Mond, 2002a; Davis, 2002)

2.8 Human Health and Worker Safety

2.8.1 Human Health

The use of radiological or hazardous materials at SNL/NM can potentially affect human health for workers and the public. In New Mexico, the average background radiation dose per person is 360 mrem/yr, more than 80 percent from natural radiation sources such as radon in the soils. The major, nonnatural source of radiation is medical testing, which accounts for 15 percent of the total dose. In FY2001, the maximum dose estimate of radioactive air emissions from SNL/NM facilities for an individual in a publicly accessible area is 3.0×10^{-3} mrem/yr, which is less than 0.001 percent of the background radiation dose. The FY2001 collective dose to the population within 50 mi was 6.82×10^{-2} person-rem/yr.

Nonradiological, chemical air pollutants are released from SNL/NM facilities that contain chemistry laboratories or chemical operations. These pollutant concentrations were below safety levels established for workers in industrial areas and diminished with increasing distance from the sources. Environmental monitoring data collected for FY2001 verify that no chemical contamination reached the public through surface water, soil, or groundwater (SNL, 2001a).

2.8.2 Worker Safety

Working conditions at SNL/NM are consistent with those identified in the SWEIS. Workers in some SNL/NM facilities receive an additional dose of radiation above background radiation, which is measured by personal radiation monitoring devices (dosimetry badges). Radiological workers at SNL/NM are limited to a total effective dose equivalent (TEDE) of 100 mrem per calendar year unless DOE approves an exception.

Accidents and Injuries

Occupational injuries and illnesses for workers at SNL/NM increased during FY2001 (see Table 2-1). There were 397 reported cases of injuries and illnesses in FY2001, compared to 326 cases analyzed in the SWEIS expanded operations alternative. No trend has been identified to account for this increase.

(Atencio, 2002)

Ionizing Radiation and Worker Exposures

Occupational radiation exposures for workers at SNL/NM during FY2001 are summarized in Table 2-1. The collective TEDE for the SNL/NM workforce during FY2001 was lower than the workforce dose of 47 mrem/yr analyzed in the SWEIS. Also, the FY2001 report of 80 workers with a collective effective dose equivalent (EDE) of 3.7 person-rem/yr was below the workforce doses for the SWEIS base year of 255 workers with an annual collective EDE of 12 person-rem/yr.

(DOE, 1999; SNL, 2002f; Potter, 2002)

The decrease in overall occupational exposure continued in part was due to workload and types of work at the ACRR and, also due to the SPR reactor having been placed in the In-Ground Storage Vault at the end of FY2000.

2.9 Traffic

During FY2001, neither KAFB nor SNL/NM performed vehicle-counting studies to develop estimates for daily traffic activity related to SNL/NM operations. The number of SNL/NM employees reported for FY2001 (6,812) however, remains within the estimated number of employees in the expanded operations alternative of the SWEIS (8,417). The SWEIS analysis estimated that 8,417 employees working at SNL/NM would result in an associated 14,940 commuter vehicles on KAFB. The term ‘commuter’ includes all vehicles operated by SNL/NM employees, contractors, and visitors, DOE employees, and additional support traffic, such as delivery vehicles. Because the number of employees for FY2001 falls within the estimate in the SWEIS for the expanded operations alternative, it can be assumed that the traffic associated with these employees would be bound by the SWEIS impact analysis for this alternative.
(DOE, 1999; Davis, 2002)

Transportation activities at SNL/NM involve the receipt, shipment, and transfer of hazardous and nonhazardous material and waste. However, detailed information on the frequency of received hazardous material, number of chemical containers, and shipments is not routinely collected and, therefore, is not reported for this annual review. At the time that the SWEIS is reviewed to determine if it still covers SNL/NM operations, DOE may elect to collect this information.

2.10 Waste Generation

Waste management activities at SNL/NM includes managing (incorporating waste minimization policies), storing, and preparing waste for offsite disposal in accordance with applicable federal and state regulations, permits, and DOE orders. SNL/NM generates nonradioactive, radioactive, and chemical waste from research operations, maintenance, construction, and environmental restoration activities. Comparisons of FY2001 waste quantities to projections made under the SWEIS expanded operations alternative include three types: radioactive waste, chemical waste, and other waste. Waste volumes reported here are for routine waste generation only, i.e., waste generated from ongoing operations. As the comparison of waste volumes generated in FY2001 shows in Table 2-1, reported waste volumes, except for solid waste, were lower than those projected under the SWEIS expanded operations alternative.

(SNL, 2002g, 2002h)

2.10.1 Radioactive Waste

SNL/NM operations generate four categories of radioactive waste: low-level waste (LLW), low-level mixed waste (LLMW), transuranic waste (TRU), and mixed transuranic waste (MTRU). In FY2001, SNL/NM generated 1,376 cubic feet (ft^3) (39.0 cubic meters [m^3]) of LLW, or 34 percent of waste volume analyzed in the SWEIS expanded operations alternative. During the same period, SNL/NM generated 76 ft^3 (2.2 m^3) of LLMW or 52 percent of the LLMW projected in the SWEIS expanded operations alternative. Table 2-1 shows no TRU and MTRU waste was generated in FY2001.

(SNL, 2002h)

2.10.2 Chemical Waste

Chemical waste generation in FY2001 was less than the 372,111 kilograms (kg) (818,644 pounds [lb]) of waste estimated under the SWEIS expanded operations alternative (excluding ER Project waste). In FY2001, SNL/NM operations generated 25,717 kg (56,577 lb) of hazardous waste. Other waste, classified as chemical waste, generated onsite under current operations includes biohazardous (medical) waste, asbestos, polychlorinated biphenyls (PCBs), nonhazardous solid waste, and process wastewater. Chemical waste generated in FY2001 included 146 kg (321 lb) of PCBs and asbestos combined. The ER Project continued to clean up past contamination at many sites, generating an additional 72,213 kg (159,200 lb) of chemical waste. Table 2-1 presents waste quantities for all chemical waste types, excluding ER Project waste.

(SNL, 2002h; Shain, 2002)

The Hazardous Waste Management Facility continued to collect, characterize, manage, and ship waste to commercial facilities for treatment and disposal (see also Section 4.6.1).

2.10.3 Solid Waste

In FY2001, SNL/NM operations generated 1.8M kg (3.9M lb) of solid waste, some 1.2M kg (3.2M lb) more than solid waste generation estimated for the SWEIS expanded operations alternative. It is believed that the increased amount of solid waste is due to a higher level of decontamination and demolition (D&D) than was projected in the SWEIS. Table 2-1 shows SNL/NM recycled 560,000 kg (1.5M lb) of solid waste.

(SNL, 2002g)

2.11 Socioeconomics

The approximately 7,520 employees working at SNL/NM in FY2001 are 89 percent of the number of the 8,417 employees estimated under the SWEIS expanded operations alternative.

In FY2001, SNL/NM remained the fifth-largest private employer in New Mexico, with a payroll of $522M. The total operating and capital budget for SNL/NM for FY2001 was approximately $1.56B (SNL, 2002c).

SNL/NM operations had a beneficial impact to the local economy in FY2001 of $4B. The SWEIS estimated that for every job at SNL/NM, an additional 2.46 jobs were created in the local economy.

(DOE, 1999)

2.12 Safety Documentation

In FY2001, SNL/NM partially revised the Safety Assessment (SA) for the Microelectronics Development Laboratory (MDL) (Hall, 2002). Revision of the Safety Assessment Document (SAD) for the Z Accelerator was started in FY2001, and continued in progress by the end of the fiscal year (Torrison, 2002). DOE approved the Technical Safety Requirements (TSRs) for the ACRR by issuing a Safety Evaluation Report (SER). The Fuel-Ringed External Cavity, Version II (FREC-II), which is located in the ACRR, also had its Safety Analysis Report (SAR) approved by the issuance of an SER. In addition, during FY2001, the DOE approved the SAR and the TSRs for the new Gamma Irradiation Facility (New GIF) (Schmidt, 2002).

Each year, several hundred Primary Hazard Screenings (PHSs) undergo review and updating. These PHSs cover a wide range of activities and facilities, including laboratories, machine shops, and test facilities. Appendix A of this document provides summaries of laboratories with PHSs added since the publication of the SWEIS and the initial Facilities and Safety Information Document (FSID) (DOE, 1999; SNL, 1999a).

2.13 Technical Area Descriptions

2.13.1 Technical Area I (TA-I) Operations

TA-I is used for administration, site support, technical support, basic research for defense programs, component development, energy programs, microelectronics, technology transfer, business outreach, and exploratory systems. This area includes laboratories and shops used by administrative and technical staff. Facilities also include a print shop, a process development laboratory, an emergency diesel generator plant, a foundry, a solvent spray booth, and a steam plant.

(SNL, 2002a)

2.13.2 TA-II Operations

TA-II was one of many facilities created to facilitate the U.S. demand for an increased nuclear capability in the early years of the Cold War. During 1948 to 1953, TA-II was the primary assembly site for America's nuclear weapons. The area was designed and constructed in 1948 specifically for the final assembly of the non-nuclear components of nuclear weapons. Weapon assembly continued in TA-II after 1952, but the major responsibility for this work shifted to other sites in the Atomic Energy Commission's integrated contractor complex. Consequently, TA-II was used for other work. Additional buildings were constructed, and the original buildings eventually were modified to accommodate research and testing of high-explosive components for nuclear weapons.

When the ECF was completed and occupied, most of the older portions of TA-II were vacated. The buildings and structures have been documented for historical significance and are approved for demolition. Two structures were removed in FY1999. The remaining structures are planned for D&D, which began in FY2001.

Other facilities near Technical Area II include the Safeguards and Security building, Shipping and Receiving, the Waste Transfer Station, Reapplication, Sample Management, and maintenance yards. These facilities demonstrate the transition of Technical Area II to site support activities.

(SNL, 2002a)

2.13.3 TA-III Operations

TA-III is composed of 20 test facilities devoted to full-scale experiments simulating various natural and induced environments. The facilities include extensive environmental test facilities, such as sled tracks, centrifuges, drop towers, a sensor test range, a low dose-rate gamma irradiation facility, and a radiant heat facility. Other facilities include a classified paper incinerator, an inactive chemical waste landfill, an inactive low-level waste landfill, a mixed waste landfill, and a large melt facility. A radioactive and mixed waste management facility occupies the southeast corner of the area. The new Model Validation and Systems Certification Test Center is under construction on the north side.

(SNL 2002a)

2.13.4 TA-IV Operations

TA-IV operations and activities taking place are diverse, although the dominant activities include pulsed-power and inertial confinement fusion technology. Other areas of activity include high-power electromagnetic applications, computer science, flight dynamics, satellite processing, robotics, and high energy/density physics programs for stockpile stewardship. The major accelerator facilities include the Z-Accelerator (formerly known as Particle Beam Fusion Accelerator II [PBFA II]), Saturn, HERMES III, Short Pulse High Intensity Nanosecond X-Radiator (SPHINX), and the Advanced Pulsed Power Research Module (APPRM).

(SNL, 2002a)

2.13.5 TA-V Operations

TA-V is a remote, secure nuclear research site housing the water-cooled ACRR, the air-cooled SPR, the new 500-kCi GIF, two Hot Cells, and various related nuclear security, waste storage, and support facilities. This area provides radiation test environments largely in support of DOE's Defense Program activities

(SNL, 2002a)

2.13.6 Other On-Site Operations

Other on-site (within the boundaries of KAFB) remote operations are conducted in facilities permitted for Sandia's use. These facilities are typically referred to as the Coyote Test Field. Operations in the Coyote Test Field include a remote violent physics test area devoted principally to explosives experiments, burn tests, explosives firing, weapon system components and explosives systems testing, explosives technology research, the solar power tower, and sled track impact zones.

(SNL 2002a)

Table 2-1. Site-Wide Environmental Issues by Resource Area

Resource Area	Units	SWEIS Baseline [a]	SWEIS Expanded Operations Alternative [b]	FY2001 Operations [c]
Land Use				
SNL/NM Land Use w/in KAFB	ac(ha)	8,824 (3,571)	8,824 (3,571)	8,574 (3,470)
DOE Buffer Zones		9,093 (3,680)	9,093 (3,680)	2,750 (1,113)
Infrastructure				
Facilities (Floor Space)	ft^2 (m^2)	5.27M[d] (0.49M)	4.99M[e] (0.46M)	5.27M (0.49M)
Utilities (Annual Basis)				
Water Use	gal (l)	440M (1.67B)	495M (1.87B)	342M (1.29B)
Water Capacity	gal (l)	2.0B (7.8B)	2.0B (7.8B)	2.0B (7.6B)
Sanitary Sewer Discharge	gal (l)	280M (1.06B)	322M (1.22B)	274M[f] (1.04B)
Sanitary Sewer Capacity	gal (l)	850M (3.22B)	850M (3.22B)	850M (3.22B)
Natural Gas Use	scf (l)	475M (13.5B)	475M (13.5B)	439M (12.4B) (at 12.14 psi)
Natural Gas Capacity	scf (l)	2.3B (65B)	2.3B (65B)	2.3B (65B)
Electrical Use	MWh	197,000	198,000	207,000
Electrical Capacity	MWh	1.1M	1.1M	1.1M
Geology and Soils				
Potential Soil/Subsurface Contamination Sites Identified	ER Sites	182	182	268[g]
Active Environmental Restoration Sites	ER Sites	20	20	5[h]
No Further Action Approvals	ER Sites	48[i]	NA	137
Water Resources and Hydrology				
SNL/NM 10-Year Projected Groundwater Use (SWEIS Projections vs. Actual Withdrawal for 2001)[j]	ft^3/yr (l/yr)	59.4M (1.68B)	62.6M (1.77B)	45.7M (1.3B)
Developed Area (for Runoff Projections)	mi^2 (km^2)	0.72 (1.8)	0.72 (1.8)	0.72[k] (1.8)
Biological/Ecological Resources				
Change in Habitat Area	NA	NA	No Change	No Change
Cultural Resources				
Cultural Resources Located in All Areas of Potential Effect	Number of Sites	192	192	192

Table 2-1. Site-Wide Environmental Issues by Resource Area (Continued)

Resource Area	Units	SWEIS Baseline [a]	SWEIS Expanded Operations Alternative [b]	FY2001 Operations [c]
Air Quality				
Nonradioactive Emissions				
Nitrogen Oxides	tons/yr	153.92	162.36	29.0
Carbon Monoxide (CO)				
Stationary Sources		15.21	18.36	25.4
Mobile Sources		4,087	3,837	3,837[m]
Construction Activities		132	132	132
Total CO		4,235	3,992	3,996
Lurance Canyon Burn Site		0.78	4.5	1.8
Particulate Matter		3.65	7.46	2.5
Sulfur Dioxide		0.32	1.10	4.7[l]
Radioactive Emissions (8 Primary Locations)[n,o]				
Argon 41	Ci/yr	44.9	40.0	16.2
Tritium		4.52	161	4.50
Nitrogen 13[p]		$4.2x10^{-2}$	0.16	0
Oxygen 15[p]		$2.6x10^{-2}$	$3.60x10^{-4}$	0
Iodine 131[q]		$1.96x10^{-3}$	3.90	0
Iodine 132[q]		$1.29x10^{-4}$	10.0	0
Iodine 133[q]		$9.51x10^{-3}$	18.0	0
Iodine 134[q]		0	0.72	0
Iodine 135[q]		$1.32x10^{-3}$	11.0	0
Krypton 83m[q]		$9.57x10^{-5}$	660.0	0
Krypton 85[q]		$1.53x10^{-3}$	0.63	0
Krypton 85m[q]		0.587	970	0
Krypton 87[q]		0.029	190	0
Krypton 88[q]		0.527	1,600	0
Xenon 131m[q]		$3.45x10^{-4}$	5.9	0
Xenon 133[q]		17.5	7,200	0
Xenon 133m[q]		0.768	340	0
Xenon 135[q]		14.7	6,900	0
Xenon 135m[q]		0.976	1,200	0
Americium-241[r]				$3.07x10^{-7}$
Strontium-90[r]				$3.83x10^{-7}$
Cesium-137[r]				$6.19x10^{-8}$
Cobalt-60[r]				$1.69x10^{-8}$
Thorium-232[r]				$3.99x10^{-6}$
Radium-228[r]				$3.74x10^{-6}$
Thorium-228[r]				$9.03x10^{-7}$
Actinium-228[r]				$3.80x10^{-6}$
Radium-224[r]				$1.09x10^{-6}$
Lead-212[r]				$3.86x10^{-6}$
Bismuth-212[r]				$1.16x10^{-6}$

Table 2-1. Site-Wide Environmental Issues by Resource Area (Continued)

Resource Area	Units	SWEIS Baseline [a]	SWEIS Expanded Operations Alternative [b]	FY2001 Operations [c]
Radioactive Emissions (8 Primary Locations)[n,o] (Cont'd.)				
Thallium-208[r]	Ci/yr			$9.08x10^{-7}$
Radium-226[r]				$4.12x10^{-6}$
Lead-214[r]				$3.37x10^{-6}$
Bismuth-214[r]				$7.15x10^{-7}$
Cesium-144[r]				$4.41x10^{-8}$
Chromium-51[r]				$5.29x10^{-8}$
Iron-59[r]				$5.61x10^{-8}$
Thorium-234[r]				$7.03x10^{-7}$
Ruthenium-106[r]				$5.13x10^{-8}$
Cesium-134[r]				$1.19x10^{-8}$
Ruthenium-103[r]				$1.06x10^{-8}$
Zirconium-95[r]				$5.08x10^{-8}$
Yttrium-88[r]				$3.19x10^{-8}$
Potassium-40[r]				$8.89x10^{-5}$
Uranium-234[r]				$2.05x10^{-7}$
Uranium-235[r]				$1.23x10^{-7}$
Uranium-238[r]				$8.10x10^{-7}$
Chemicals Purchased[s,t]				
Hazardous Air Pollutants (HAPs)	tons/yr	2.4	4.3	3.5
Toxic Air Pollutants(TAPs)		13	34.2	20.1
Volatile Organic Compounds (VOCs)		16	37.7	12.95
Human Health and Worker Safety				
Annual Collective Dose	Person-rem/yr	12 (255 workers)	19 (400 workers)	3.7 (80 workers)
Average TEDE	mrem/yr	47	47	43.5
Injury/Illness Rate	cases/yr	311	326	397
Transportation				
SNL/NM Commuters	Vehicles	13,582	14,940	14,940[u]
Waste Generation (Selected Facilities Plus Balance of Operations)				
Radioactive Waste				
Low-Level Waste	ft^3 (m^3)	3,322 (94)	9,897 (280)	1,376 (39.0)
Low-Level Mixed Waste		750 (21)	1,445 (41)	76 (2.2)
Transuranic Waste		0 (0)	26 (0.74)	0 (0)
Mixed Transuranic Waste		16 (0.45)	37 (1.05)	0 (0)
Total Radioactive Waste		4,088 (115.6)	11,405 (322.6)	1,452 (41.1)

Table 2-1. Site-Wide Environmental Issues by Resource Area (Continued)

Resource Area	Units	SWEIS Baseline [a]	SWEIS Expanded Operations Alternative [b]	FY2001 Operations [c]
Radioactive Emissions (8 Primary Locations)[n,o] (Cont'd.)				
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Table 2-1. Site-Wide Environmental Issues by Resource Area (Continued)

Resource Area	Units	SWEIS Baseline [a]	SWEIS Expanded Operations Alternative [b]	FY2001 Operations [c]
Chemical Waste				
RCRA Hazardous Waste	kg (lb)	55,852 (122,874)	92,314 (203,091)	25,717 (56,577)
TSCA (PCBs and Asbestos)		147,055 (323,521)	122,000 (268,400)	146 (321)
Non-RCRA Chemicals		69,321 (152,506)	114,576 (252,067)	27,224 (59,893)
Biohazardous		2,463 (5,419)	4,071 (8,956)	302 (666)
Recyclable Materials (Hazardous)[v]		60,768 (133,690)	100,439 (220,966)	7,900 (17,412)
Total Chemical Waste		335,459 (738,010)	433,400 (953,480)	61,289 (134,836)
Solid Waste[w]	kg (lb) m^3 (yd^3)	0.6M (1.3M) 2,022 (2,644)	0.6M (1.3M) 2,022 (2,644)	1.8 (3.9M) 6,066 (7,934)
Solid Waste Recyclable[w]	kg (lb)	1.58M (3.48M)	Not Estimated	560,000 (1.5M)
Noise and Vibration				
SNL/NM Estimated Number of Noise/Vibration-Producing Tests[x]	Tests/ day	4.1	15.6	1.2
Socioeconomics				
Employment	FTEs	7,652	8,417	7,465
Payroll	Dollars	480M	530M	490M
Expenditures	Dollars	1.43B	1.57B	1.463B

[a]The SWEIS baseline represented annual operational activities in FY1996 or FY1997, depending on which year data were available.

[b]The SWEIS expanded operations alternative represents an estimate of SNL/NM operations increasing to the highest reasonable activity that could be supported by then-current facilities, their potential expansion, and construction of new facilities for future actions specifically identified in the SWEIS.

[c]FY2001 Operations are actual, reported SNL/NM activities and associated material use, waste generation, and other support for FY2001.

[d]See footnote in Table 5.4.2-1 of the SWEIS.

[e]GSF by 2008; see footnote in Table 5.4.2-1 of the SWEIS.

[f]Based on an estimated average daily usage of ~750,000 gal.

[g]Includes 61 newly created Solid Waste Management Units (previously non-ER Project septic systems) and sites and subsites related to the *Hazardous and Solid Waste Amendments* permit.

[h]Sites which are not currently scheduled for NFAs due to ongoing activities, per the definition of "Active Environmental Restoration Sites" negotiated with the New Mexico Environment Department (NMED).

[i]Page 5-18 of the SWEIS.

[j]The SWEIS included annual and total projections of SNL/NM groundwater withdrawal over a 10-year period from 1998 through 2007. The projections incorporated gradual accomplishment of a 30-percent water conservation factor by SNL/NM by 2004. Within this trend, the projected SNL/NM groundwater withdrawal in the SWEIS for 2001 is compared to the actual reported withdrawal for the same period.

[k]Estimate based on no changes to undeveloped land.

[l]Quantity was high due to natural gas prices in the winter of FY2001; more diesel oil was burned at the Steam Plant than in previous years.

Table 2-1. Site-Wide Environmental Issues by Resource Area (Continued)

Resource Area	Units	SWEIS Baseline [a]	SWEIS Expanded Operations Alternative [b]	FY2001 Operations [c]
Chemical Waste				
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Expenditures	Dollars	1.43B	1.57B	1.463B

[a]The SWEIS baseline represented annual operational activities in FY1996 or FY1997, depending on which year data were available.

[b]The SWEIS expanded operations alternative represents an estimate of SNL/NM operations increasing to the highest reasonable activity that could be supported by then-current facilities, their potential expansion, and construction of new facilities for future actions specifically identified in the SWEIS.

[c]FY2001 Operations are actual, reported SNL/NM activities and associated material use, waste generation, and other support for FY2001.

[d]See footnote in Table 5.4.2-1 of the SWEIS.

[e]GSF by 2008; see footnote in Table 5.4.2-1 of the SWEIS.

[f]Based on an estimated average daily usage of ~750,000 gal.

[g]Includes 61 newly created Solid Waste Management Units (previously non-ER Project septic systems) and sites and subsites related to the *Hazardous and Solid Waste Amendments* permit.

[h]Sites which are not currently scheduled for NFAs due to ongoing activities, per the definition of "Active Environmental Restoration Sites" negotiated with the New Mexico Environment Department (NMED).

[i]Page 5-18 of the SWEIS.

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[k]Estimate based on no changes to undeveloped land.

[l]Quantity was high due to natural gas prices in the winter of FY2001; more diesel oil was burned at the Steam Plant than in previous years.

[m]Based on the SNL/NM full-time employee population for FY2001 (6,812), vehicle-related CO emissions for FY2001 would remain within the 10-percent increase over the base year that was estimated for the expanded operations alternative.
[n] In FY2001, there were eight primary radionuclide air emissions sources at SNL/NM that were used to calculate dose estimated to the public, as opposed to the original 10 that were used in the SWEIS.
[o]All data for radioactive emissions are for CY2001.
[p]The zero value is due to HERMES III being dropped from the primary source list.
[q]Original SWEIS estimate was based on Mo-99 production occurring at the ACRR; the production of Mo-99 is currently in suspension.
[r]Radionuclide was not analyzed in the SWEIS; CY2001 emission value is based on a conservatively high estimate of the release fraction at the CWL.
[s]For reporting purposes, chemical purchases are assumed to equal emissions. The screening process groups chemical purchases into three categories.
[t]Quantities reported include emission factor corrections (see Appendix D of the SWEIS).
[u]SNL/NM employee population estimated for FY2001 (6,812) indicates that associated traffic activities would remain within the SWEIS population (8,417) and traffic-related activities included in the expanded operations alternative.
[v]Added the term "hazardous" for clarification.
[w]Solid Waste Transfer Facility reports annual rates.
[x]In FY2001, a total of 310 tests (at Selected Facilities) were completed.
Sources: DOE, 1999; SNL, 2000a, b; SNL, 2001a; SNL, 2002f, g, i; Freshour, 2002; du Mond, 2002a-b; Eckstein, 2002b; and Martin, 2002; Atencio, 2002; Jones, 2002; Rogers, 2002; Potter, 2002; SNL, 2002f; SNL, 2002g; Davis, 2002; Aragon, 2002.

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CHAPTER 3.0
SUMMARY OF NEW AND MODIFIED FY2001 SNL/NM OPERATIONS

CONTENTS

TABLES

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3.0 SUMMARY OF NEW AND MODIFIED FY2001 SNL/NM OPERATIONS

3.1 FY2001 SNL/NM Facility Modifications and Additions

The SNL/NM Site-Wide Environmental Impact Statement (SWEIS) assessed seven planned facility construction and modification projects at SNL/NM (DOE, 1999, 2000). Specifically, the SWEIS expanded operations alternative included a discussion of construction or modifications at the New Gamma Irradiation Facility (NGIF), the Steam Plant, the Neutron Generator Facility (NGF), the Microsystems and Engineering Science Applications (MESA) Complex, the Sandia Pulsed Reactor (SPR), the Radiographic Integrated Test Stand (RITS), and the Annular Core Research Reactor (ACRR). Several facilities started or continued construction or modifications in Fiscal Year (FY) 2001:

- The Steam Plant refurbished two boilers to have Flue Gas Recirculation (FGR) installed, which is expected to reduce nitrogen oxide emissions.
- Security and support upgrades to the Neutron Generator Facility.
- The MESA project continued early planning and development activities in FY2001. If funded to full implementation, the MESA project could include an estimated $300 million (M) state-of-the-art complex (260,000 gross square feet [ft^2], or 24,180 square meters [m^2]). The project initiated some retooling of existing operations in FY2001.
- Construction began on the Radiographic Integrated Test Stand (RITS) accelerator, anticipated to be completed and to start operations in FY2002. Originally, plans called for RITS to be built, beginning in FY2000, in a space currently occupied by the Proto II accelerator, which has been nonoperational since FY1999. These plans have been delayed and revised so that now RITS, when it is built, would be built in the current location of the Sandia Accelerator and Beam Research Experiment (SABRE).
- Demolition work began at the Containment Technology Test Facility (CTTF) in FY2001 in preparation for returning the permitted land back to the U.S. Air Force in (USAF) FY2002.

Proposed operations for medical isotope production at the ACRR remained in suspension during FY2001. During the year, the reactor operated in the pulse mode for a limited number of defense-related tests and production of non-medical isotopes.

In FY2001, other projects were completed that were included in the SWEIS analysis for "balance of plant" operations, including facility maintenance and refurbishment. Below are brief summaries of the changes that occurred in FY2001:

- The SNL cafeteria renovation (east of Tech Area I [TA-I]), which began in FY2000, was completed in FY2001.
- Renovation was completed at the north end of the building that houses Computing, Field Test, QA, and Special Projects in TA-I.
- Construction continued on the buildings that house the Repetitive High Energy Pulsed-Power Unit I (RHEPP I) and at the Z Accelerator.

- Several infrastructure projects were completed involving road improvements and utility upgrades. Portions of the sanitary sewer system and domestic water system were rehabilitated.
- The Processing and Environmental Technology Laboratory (PETL) was completed. (This action was covered by an EA.)
- Construction was completed on an addition to the Explosive Components Facility (ECF).
- Remodeling was completed in the Administrative Center for Test Engineering in TA-III.

(SNL, 2001a)

3.2 Comparison of FY2001 SNL/NM Selected Facility Operations to SWEIS Baseline and Expanded Operations Alternative

The operations of the major SNL/NM selected facilities were the bases for assessing the operational impacts analyzed in the SWEIS. Taken together, these facilities and facility groups represent the majority of exposure risks associated with continuing operations at SNL/NM. At the time the SWEIS was prepared and, according to the SWEIS baseline data, these facilities represented:

- Over 99 percent of all radiation doses to SNL/NM personnel.
- Over 99 percent of all radiation doses to the public.
- From 81 to 99 percent of stationary source criteria pollutants (nitrogen dioxide, carbon monoxide, particulate matter less than 10 microns in diameter [PM_{10}], and sulfur dioxide), depending on the alternative. This does not include hazardous air pollutants or toxic air pollutants, which instead are analyzed on a site-wide basis in the SWEIS. The remaining stationary source criteria pollutants are associated with backup generators.
- All waste volumes, including radioactive waste, Environmental Restoration (ER) Project waste, and hazardous waste, which are accounted for in analyses of infrastructure, radiological air quality, transportation, and waste generation.

(DOE, 1999)

This chapter provides a summary of changes in selected facility operations information compared to the original SWEIS baseline and the highest projections of operations under the expanded operations alternative.

3.2.1 Selected Facilities in TA-I and TA-II

In FY2001, operational activities for all five of the selected facilities in TA-I and TA-II were within operational parameters analyzed in the SWEIS expanded operations alternative. At the Neutron Generator Facility (NGF), production of neutron generators continued to be less than the expanded operations projection established in the SWEIS. The activities at the Microelectronics Development Laboratory (MDL) resulted in production of 5,000 wafers. The Advanced Manufacturing Processes Laboratory (AMPL) conducted 312,000 hours of operations in FY2001, and the Explosive Components Facility (ECF) continued to conduct operations at levels comparable to what were established in the SWEIS baseline. (See Section 3.2.7 for detailed comparison to SWEIS projections.)

The Integrated Materials Research Laboratory (IMRL) remained at the levels established in the SWEIS analysis. In FY2001, the IMRL eliminated processes that used chlorine gas and boron trichloride gas. SNL/NM also obtained a permit from the City of Albuquerque to allow for disposal of nonhazardous, sterile biowaste in the sanitary sewer.

(SNL, 2002i)

3.2.2 Physical Testing and Simulation Facilities (TA-III)

In FY2001, operational activities for all four of the physical testing and simulation facilities in TA-III were within operational parameters analyzed in the SWEIS expanded operations alternative (see Section 3.2.7). The Terminal Ballistics Complex (TBC) was the most active of the facilities, completing 75 tests in FY2001. This was well within the total of 450 tests analyzed in the SWEIS. The Drop/Impact Complex was the least active, having completed only three tests in FY2001. In addition, the TBC revised the facility Primary Hazard Screening (PHS) and received a burn permit for using thermite.

(SNL, 2002i)

3.2.3 Accelerator Facilities (TA-IV)

In FY2001, operational activities for all ten of the selected facility accelerators in TA-IV were within operational parameters analyzed in the SWEIS expanded operations alternative (see Section 3.2.7). Two facilities (the Repetitive High Energy Pulsed-Power [RHEPP II] accelerator and RITS), were not active and conducted no tests in FY2001. Of the eight facilities that did conduct tests in FY2001, the Short-Pulse High Intensity Nanosecond X-Radiator (SPHINX) was the most active, with 1,338 accelerator shots; the Tera-Electron Volt Energy Superconducting Linear Accelerator (TESLA) was the least active, with 37 shots. Testing in the Saturn, SABRE, High-Energy Radiation Megavolt Election Source III (HERMES III), RHEPP I, TESLA, SPHINX, Z Accelerator, and Advanced Pulsed-Power Research Module (APPRM) in FY2001 all fell within the SWEIS analysis.

SNL/NM installed two new processes in the Materials Processing and Coating Laboratory, which is housed in the same building as the HERMES III accelerator. These new processes included the single-point diamond-turning and hydrogen/vacuum firing processes. APPRM installed a new tank. In FY2001, TESLA installed a second oil tank external to the existing tank to improve testing capabilities.

SNL/NM also completed preparatory work on the Z Accelerator for a new series of experiments using depleted uranium, and to restart target cleaning activities, which require metal grinding of surfaces contaminated with beryllium (and potentially lead).

(SNL, 2002i)

3.2.4 Reactor Facilities (TA-V)

In FY2001, operational activities for all reactor facilities, except the Annular Core Research Reactor (ACRR), were within operational parameters analyzed in the SWEIS expanded operations alternative (see Section 3.2.7). In July of FY2001, the U.S. Department of Energy/Kirtland Area Office (DOE/KAO) prepared the *Supplement Analysis, SWEIS for SNL/NM, Reestablishing Long-Term Pulse Mode Testing Capability at the Annular Core Research Reactor, Sandia National Laboratories, New Mexico,* to address the long-term environmental effects of reestablishing long-term pulse mode testing at the ACRR (DOE, 2001). DOE/OKSO determined in the supplement analysis that the additional pulse-mode testing would not constitute substantial changes to ACRR operations analyzed in the SWEIS. The Gamma Irradiation Facility (GIF), NGIF, Hot Cell Facility (HCF), and Sandia Pulsed Reactor (SPR) had no operations in FY2001.

In the first quarter of FY2001, cobalt-60 (Co-60) sources were moved from the old GIF to the NGIF facility. This was documented in *Gamma Irradiation Facility (GIF) Safety Analysis Report*, (Boldt et al., 2000), and *Technical Safety Requirements for the Gamma Irradiation Facility (GIF)* (Mahn, 2000). It is estimated that, as the customer base increases, the NGIF will increase operational hours, but will remain within the SWEIS analysis.

The HCF continues to remain in standby mode because of the suspension of the Medical Isotopes Production Program (MIPP). No tests were completed in the SPR in FY2001. In FY2003, the SPR is expected to be returned to the Sandia Pulsed Reactor Facility (SPRF) and restored to operational status, pending development of the proposed Sandia Underground Reactor Facility (SURF).

(SNL, 2002i)

3.2.5 Outdoor Test Facilities

Test activities at all five of the outdoor test facilities were within operational parameters analyzed in the SWEIS expanded operations alternative. The Explosives Applications Laboratory (EAL), with 180 tests, was the most active; the Containment Technology Test Facility (CTTF) West was the least active, with no operations in FY2001. The CTTF West has been decommissioned and demolished, and the permitted land returned to the USAF in FY2002. None of the five facilities added new capabilities in FY2001.

(SNL, 2002i)

3.2.6 Infrastructure Facilities

In FY2001, infrastructure facilities activities for all four of these selected facilities remained essentially unchanged from activities analyzed in the SWEIS. The Steam Plant produced 529 million pounds (M lb) of steam, which is below the 544M lb projected under the SWEIS expanded operations alternative. During the year, two boilers were refurbished to install flue gas recirculation (FGR); this is expected to reduce nitrogen oxide emissions. The quantities of waste handled at the Hazardous Waste Management Facility (HWMF), Radioactive and Mixed Waste Management Facility (RMWMF), and the Thermal Treatment Facility (TTF) continued a declining trend in FY2001 that began prior to FY1996 (see Section 3.2.7).

The Thermal Treatment Facility (TTF) supports the operations of the Light Initiated High Explosive (LIHE) facility. The LIHE process generates light-sensitive, high-explosive waste that cannot be transportated and, therefore, must be treated on-site in the TTF. In 1992, the LIHE was mothballed, but the TTF continued to be maintained to provide the capability of restarting LIHE. The TTF also provides treatment of certain SNL waste streams. The decision to restart LIHE was made in FY2001, with expected funding for building renovation to become available.

(SNL, 2002i)

3.2.7 Summary for Selected Facilities

Table 3-1 summarizes FY2001 facility operations compared to the SWEIS baseline and projections for the expanded operations alternative.

Table 3-1. Comparison of FY2001 SNL/NM Selected Facility Activities to SWEIS/ROD Baseline and Expanded Operations [a]

SNL/NM Tech Areas	Selected Facility Capability Descriptions and FY2001 Modifications	SNL/NM SWEIS/ROD Baseline Operations Activities (FY1996-97)	SNL/NM SWEIS/ROD Expanded Operations Activities	SNL/NM FY2001 Operations Activities Update
TA-I and TA-II	**Advanced Manufacturing Process Laboratory (AMPL)** • Develops and applies advanced manufacturing techniques, including hardware manufacturing, emergency and prototype manufacturing, development of manufacturing processes, and design and fabrication of production equipment.	Operations of 248,000 hours per year.	Operations up to a maximum of 347,000 hours per year.	Operations of 312,000 hours for FY2001.
	Explosive Components Facility • Supports the Neutron Generator Facility. • Conducts research and development on energetic components, including explosives, chemicals, and batteries.	Operations involving neutron generator tests, 600 explosives tests, 900 chemical analyses, and 50 battery tests per year.	Expanded operations involving neutron generator tests, 900 explosives tests, 1,250 chemical analyses, and 100 battery tests per year.	Operations supported completion of neutron generator tests, 600 explosives tests, 900 chemical analyses, and 55 battery tests in FY2001.
	Integrated Materials Research Laboratory (IMRL) • Conducts research on materials and advanced components, including basic chemistry, physics, and energy technology.	Operations of 395,454 hours per year.	Operations up to 395,454 hours per year.	Operations of 395,454 hours for FY2001.
	Microelectronics Development Laboratory (MDL) • Conducts research and development on microelectronic devices for nuclear weapons. • Produces integrated circuits and wafers. • Develops technologies and manufacturing processes to support production requirements.	Production of 4,000 wafers per year.	Production of up to 7,500 wafers per year.	Production of 5,000 wafers in FY2001.

Table 3-1. Comparison of FY2001 SNL/NM Selected Facility Activities to SWEIS/ROD Baseline and Expanded Operations (Continued)

SNL/NM Tech Areas	Selected Facility Capability Descriptions and FY2001 Modifications	SNL/NM SWEIS/ROD Baseline Operations Activities (FY1996-97)	SNL/NM SWEIS/ROD Expanded Operations Activities	SNL/NM FY2001 Operations Activities Update
TA-I and TA-II (Cont'd.)	**Neutron Generator Facility (NGF)** • Fabricates neutron generators and neutron tubes. • Implemented security upgrades and building modifications. • Installed Braze Hydrogen Furnace and moved existing furnace.	NAPD[b]	NAPD	NAPD
TA-III	**Centrifuge Complex** • Tests objects weighing several tons at over 100 times the force of gravity.	Operations supporting 32 centrifuge tests and 0 impact tests per year.	Operations supporting 120 centrifuge tests and 100 impact tests per year.	Operations supporting 21 centrifuge tests and 0 impact tests in FY2001.
	Drop/Impact Complex • Conducts tests to validate analytical modeling and weapons systems certification. • Conducts research focused on water and underwater tests, design verification, and performance assessments.	Operations supporting 18 drop tests, 1 water impact test, 1 submersion test, and 0 underwater blasts per year.	Expanded operations would support up to a maximum of 50 drop tests, 20 water impact tests, 5 submersion tests, and 10 underwater blasts per year.	Operations supported 3 drop tests, 0 water impact tests, 0 submersion tests, and 0 underwater blasts for FY2001.
	Sled Track Complex • Conducts testing to simulate high-speed impacts of weapons shapes, substructures, and components to verify design integrity, performance, and fusing functions. • Conducts research testing of parachute systems, transportation equipment, and reactor safety.	Operations supporting 10 rocket sled tests, 12 explosives tests, 3 rocket launches, and 40 free-flight launches per year.	Expanded operations would support up to a maximum of 80 rocket sled tests, 239 explosives tests, 24 rocket launches, and 150 free-flight launches per year.	Operations supported 12 rocket sled tests, 10 explosives tests, 3 rocket launches, and 22 free-flight launches in FY2001.
	Terminal Ballistics Complex • Conducts solid-fuel rocket motor tests and ballistics studies in areas of armor penetration, vulnerability, acceleration, flight dynamics, and accuracy. • Tests projectile impacts (all calibers).	Operations supporting 50 projectile impact tests and 25 propellant tests per year.	Expanded operations would support up to a maximum of 350 projectile impact tests and 100 propellant tests per year.	Operations supported 50 projectile impact tests and 25 propellant tests for FY2001.

Table 3-1. Comparison of FY2001 SNL/NM Selected Facility Activities to SWEIS/ROD Baseline and Expanded Operations (Continued)

SNL/NM Tech Areas	Selected Facility Capability Descriptions and FY2001 Modifications	SNL/NM SWEIS/ROD Baseline Operations Activities (FY1996-97)	SNL/NM SWEIS/ROD Expanded Operations Activities	SNL/NM FY2001 Operations Activities Update
TA-IV	**Advanced Pulsed-Power Research Module (APPRM)** • Evaluates the performance and reliability of components, including next-generation accelerators. • Conducts research and development in pulsed-power technologies (power storage, high-voltage switching, and power flow).	Operations supporting 40 shots per year.	Expanded operations would support a maximum of 2,000 shots per year.	Operations supported 300 shots in FY2001.
	High-Energy Radiation Megavolt Electron Source III (HERMES III) Accelerator • Produces gamma-ray effects testing capabilities. • Conducts testing on electronic components and weapons systems for high-fidelity simulation over large areas in near-nuclear-explosion radiation environments.	Operations supporting 262 shots per year.	Expanded operations would support up to a maximum of 1,450 shots per year.	Operations supported 183 shots in FY2001.
	Radiographic Integrated Test Stand (RITS) Accelerator • When operational, will develop and demonstrate capabilities for future accelerator facility design, focusing on demonstrating inductive voltage technology.	Operations estimated to support 500 shots per year. (Not constructed when the SWEIS was prepared.)	Expanded operations would support a maximum of 800 shots per year.	Was not yet operational during FY2001.
	Repetitive High Energy Pulsed-Power I (RHEPP-I) Accelerator • Develops pulsed-power technology, including high-power energy tests. • Conducts basic scientific research, development, and testing.	Operations supporting 500 shots per year.	Expanded operations would support up to a maximum of 10,000 tests per year in either single or repetitive modes.	2,494 shots were completed in FY2001.
	Repetitive High Energy Pulsed-Power II (RHEPP-II) Accelerator • Develops radiation-processing applications using powerful electron or x-ray beams. • Tests high-power magnetic switches and specialty transmission lines.	Operations supporting 80 shots per year.	Expanded operations would support a maximum of 800 shots per year.	No shots were made in FY2001.

Table 3-1. Comparison of FY2001 SNL/NM Selected Facility Activities to SWEIS/ROD Baseline and Expanded Operations (Continued)

SNL/NM Tech Areas	Selected Facility Capability Descriptions and FY2001 Modifications	SNL/NM SWEIS/ROD Baseline Operations Activities (FY1996-97)	SNL/NM SWEIS/ROD Expanded Operations Activities	SNL/NM FY2001 Operations Activities Update
TA-IV (Cont'd.)	**Sandia Accelerator and Beam Research Experiment (SABRE) Accelerator** • Provides x-ray and gamma-ray testing capabilities. • Tests pulsed-power technologies, fusion systems, weapons systems, computer science, flight dynamics, satellite systems, and robotics.	Operations supporting 187 shots per year.	Expanded operations would support a maximum of 400 shots per year.	Operations supported 150 shots in FY2001.
	Saturn Accelerator • Produces x-rays to simulate the radiation effect of nuclear bursts on electronic and material components. • Conducts research on satellite systems, weapons material and components, and reentry vehicle and missile systems.	Operations supporting up to a maximum of 65 shots per year.	Expanded operations would support up to a maximum of 500 shots per year.	Operations supported 137 shots in FY2001.
	Short-Pulse High Intensity Nanosecond X-Radiator (SPHINX) Accelerator • Produces high-voltage accelerations to measure x-ray-induced currents in integrated circuits and detect-response in materials. • Performs radiation measurements for weapons components.	Operations supporting 1,185 shots per year.	Expanded operations would support a maximum of 6,000 shots per year.	Operations supported 1,338 shots in FY2001.
	Tera-Electron Volt Energy Superconducting Linear Accelerator (TESLA) • Tests plasma opening switches for pulsed-power drivers. • Conducts basic research in science, material development, and material testing.	Operations supporting 150 shots per year.	Expanded operations would support a maximum of 6,000 shots per year.	Operations supported 50 shots in FY2001.
	Z Accelerator • Conducts pulse tests on targets to simulate special atmospheric conditions and fusion reaction conditions.	Operations supporting 150 shots per year.	Expanded operations would support a maximum of 350 shots per year.	Operations supported 162 shots in FY2001.

Table 3-1. Comparison of FY2001 SNL/NM Selected Facility Activities to SWEIS/ROD Baseline and Expanded Operations (Continued)

SNL/NM Tech Areas	Selected Facility Capability Descriptions and FY2001 Modifications	SNL/NM SWEIS/ROD Baseline Operations Activities (FY1996-97)	SNL/NM SWEIS/ROD Expanded Operations Activities	SNL/NM FY2001 Operations Activities Update
TA-V	**Annular Core Research Reactor (ACRR)** • Produces medical isotopes. • Supports Defense Programs activities.	Irradiation of 8 production targets and 0 defense-related test series.	Expanded operations would support up to a maximum of 1,300 targets and 2 to 3 defense-related test series.	Five defense-related test series were completed in FY2001.
	Gamma Irradiation Facility (GIF) • Supplements the capabilities of the New Gamma Irradiation Facility. • Performs gamma-irradiation experiments.	Operations supporting 1,000 hours.	Expanded operations up to a maximum of 8,000 hours per year.	No test hours were completed in FY2001.
	Hot Cell Facility (HCF) • Supports medical isotopes production, including extraction, purification, product packaging, and quality control. • Supports Defense Programs by providing the capabilities for its short-term testing.	Processing of 8 production targets.	Expanded operations would support up to a maximum of 1,300 targets and 2 to 3 defense-related test series.	Facility was in standby mode. No medical isotope production during FY2001.
	New Gamma Irradiation Facility (NGIF) • Performs gamma-irradiation experiments under both dry and water-pool conditions. • Conducts studies in thermal and radiation effects, weapons component degradation, nuclear reactor material and components, and nonweapon applications.	Not constructed when the SWEIS was prepared. (Construction and operations analyzed in a separate environmental assessment.)	Expanded operations up to a maximum of 24,000 hours per year.	No test hours were completed in FY2001.
	Sandia Pulsed Reactor (SPR) Facility • Provides multiple, fast-burst reactor, near-fusion spectrum radiation environments. • Tests technologies that support both defense and nondefense projects.	Operations supporting 100 irradiation tests.	Expanded operations would support up to a maximum of 200 irradiation tests.	No irradiation tests were performed in FY2001.

Table 3-1. Comparison of FY2001 SNL/NM Selected Facility Activities to SWEIS/ROD Baseline and Expanded Operations (Continued)

SNL/NM Tech Areas	Selected Facility Capability Descriptions and FY2001 Modifications	SNL/NM SWEIS/ROD Baseline Operations Activities (FY1996-97)	SNL/NM SWEIS/ROD Expanded Operations Activities	SNL/NM FY2001 Operations Activities Update
With-drawn Area	**Aerial Cable Facility Complex** • Conducts impact tests involving weapon systems and aircraft components. • Provides capability for free-fall drop, rocket pull-down, and captive flight tests, data recording, and simulation technologies. • Maintains the capability for drop tests of joint test assemblies that contain depleted uranium, enriched uranium, and insensitive high explosives.	Operations supporting 21 drop/pull-down tests, 6 aerial target tests, and 0 (series of) scoring system tests.	Expanded operations would support up to a maximum of 100 drop/pull-down tests, 30 aerial target tests, and 2 series of scoring system tests.	Operations supported 5 drop/pull-down tests, 0 aerial target tests, and 0 series of scoring system tests in FY2001.
	Lurance Canyon Burn Site • Tests, certifies, and validates material and system tolerances. • Burns test objects for short periods of time under controlled conditions.	Operations supporting 12 certification tests, 56 model validation tests, and 37 user tests.	Expanded operations would support up to a maximum of 55 certification tests, 100 model validation tests, and 50 user tests.	Operations supported 8 certification tests, 45 model validation tests, and 20 user tests in FY2001.
CTF (Coyote Test Field)	**Containment Technology Test Facility-West** • Conducts a series of successive experiments leading up to ultimate failure of test vessels.	Operations supporting 1 survivability test.	Expanded operations would support up to a maximum of 2 survivability tests.	Operations supported 0 survivability tests in FY2001; the facility is scheduled for decontamination and demolition.
	Explosives Applications Laboratory • Designs, assembles, and tests explosive materials, components, and equipment. Work involves arming, fusing, and firing of explosives and testing of components.	Operations supporting 240 explosive tests.	Expanded operations would support up to a maximum of 360 explosive tests.	Operations supported 180 explosive tests in FY2001.
	Thunder Range Complex • Performs disassembly and evaluation, and calibration and verification testing of special nuclear and nonnuclear systems. • Provides capability for cleaning, physical examination, measurement, sampling, photography, and data collection.	Operations supporting 60 days of equipment disassembly and 1 test series.	Expanded operations would support up to a maximum of 144 days of equipment disassembly and 10 test series.	Operations supported 5 days of equipment disassembly and 1 test series in FY2001.

Table 3-1. Comparison of FY2001 SNL/NM Selected Facility Activities to SWEIS/ROD Baseline and Expanded Operations (Continued)

SNL/NM Tech Areas	Selected Facility Capability Descriptions and FY2001 Modifications	SNL/NM SWEIS/ROD Baseline Operations Activities (FY1996-97)	SNL/NM SWEIS/ROD Expanded Operations Activities	SNL/NM FY2001 Operations Activities Update
Infra-structure	**Hazardous Waste Management Facility (HWMF)** • Handles, packages, stores, and ships hazardous, toxic, and nonhazardous chemical waste. • Prepares waste for offsite transportation for recycling, treatment, or disposal at licensed facilities.	Management of 203,000 kg per year, including 55,852 kg of RCRA hazardous waste.	Management of 214,000 kg per year, including 92,314 kg of RCRA hazardous waste.	Management of 66,559 kg of RCRA hazardous waste was managed in FY2001.
	Radioactive and Mixed Waste Management Facility (RMWMF) • Serves as a centralized facility for receipt, characterization, compaction, treatment, repackaging, certification, and storage of low-level waste (LLW), transuranic waste (TRU), low-level mixed waste (LLMW), and mixed transuranic waste (MTRU). • Prepares waste for offsite treatment and disposal at licensed facilities.	Management of 1.6 million pounds per year, including 11,874 ft^3 of LLRW; 5,353 ft^3 of LLMW; 214 ft^3 of TRU; and 16 ft^3 of MTRU.	Management of 2.7 million pounds per year, including 19,592 ft^3 of LLW; 8,833 ft^3 of LLMW; 353 ft^3 of TRU; and 37 ft^3 of MTRU.	Management of 1.9 million pounds in FY2001, including 10,202 ft^3 of LLW; 364 ft^3 of LLMW; 0 ft^3 of TRU; and 1 ft^3 of MTRU.
	Steam Plant • Produces and distributes steam to SNL/NM and Kirtland Air Force Base facilities.	Steam production was ~ 544 million pounds.	Maximum steam production was set at 544 million pounds.	Steam production was 527 million pounds in FY2001.
	Thermal Treatment Facility • Burns small quantities of explosive materials and explosives-contaminated water.	Treatment of a minimal amount of waste.	Treatment of a maximum of 1,200 pounds of waste.	No treatment of waste in FY2001.

[a]Extensive descriptions of capabilities and activities, (e.g., hours per year) are provided in the SNL/NM Facilities and Safety Information Document (SNL, 1999a).
[b]Not Available for Public Distribution.
Source: DOE, 1999, 2000; SNL, 2002i.

3.3 Comparison of FY2001 SNL/NM Notable Facility Operations to Source Information Used to Support the SWEIS

This section compares FY2001 SNL/NM operations to source information published in the SNL/NM Facilities and Safety Information Document (FSID), that was incorporated by reference into the SNL/NM SWEIS (DOE, 1999; SNL, 1999a). Notable facility operations were included in the SWEIS analysis within the balance of operations.

3.3.1 Notable Facilities Operations at SNL/NM

Of the 15 notable facilities identified at SNL/NM, none recorded increases in operational levels during FY2001 (see Chapter 5). Two facilities, the Sandia Lightning Facility and the Proto II accelerator, did not operate in FY2001.

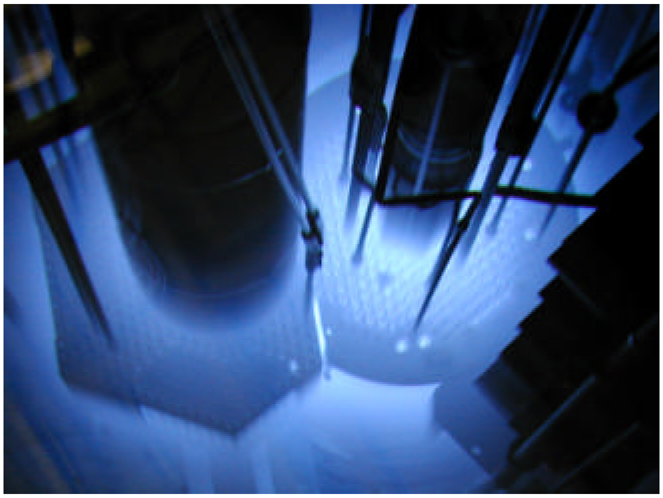
The Sandia Lightning Facility is slated to be refurbished during FY2002 to support weapons validation tests scheduled to start in FY2003, as part of the Life Extension Programs. It is expected that the budget for the Liquid Metal Processing Laboratory (LMPL) will increase 25 percent for FY2002, with an additional 25 percent for FY2003. This potential increase in funding is expected to support an increase in activities and experimentation at the LMPL. None of the fifteen notable facilities added new capabilities in FY2001.

(SNL, 2002i)

CHAPTER 4.0
FY2001 SELECTED FACILITIES OPERATIONS

CONTENTS

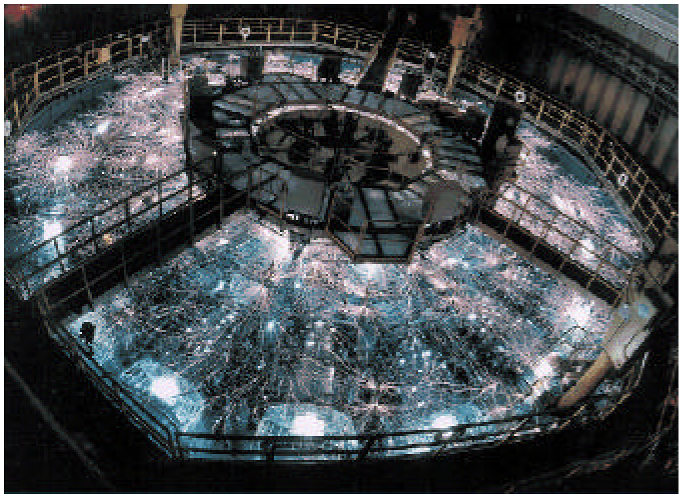
TABLES



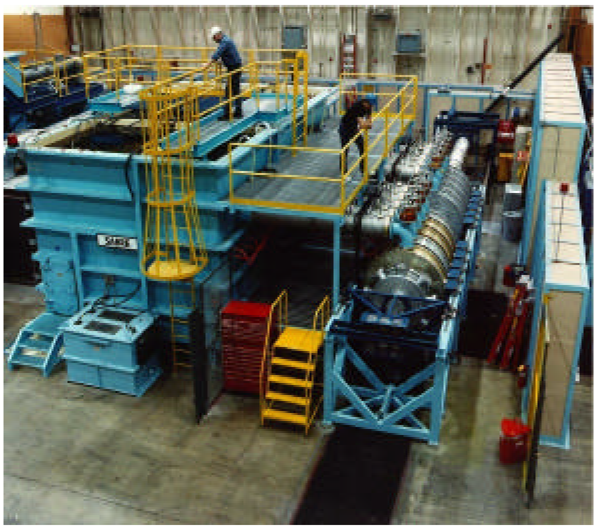
Annular Core Research Reactor

Gamma Irradiation Facility Chamber

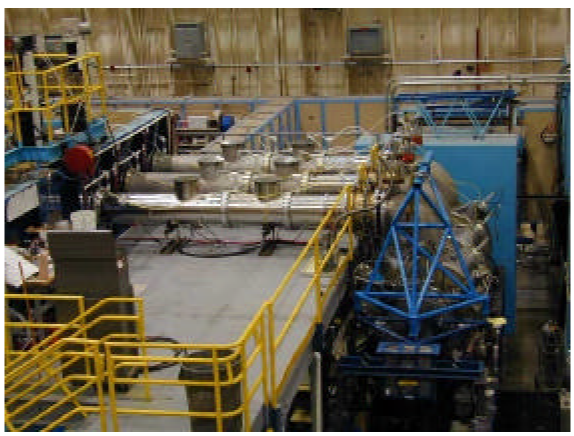
Integrated Materials Research Laboratory



Z-Accelerator



Sandia Accelerator for Beam Research (SABRE)



Radiographic Integrated Test Stand (RITS)

4.0 SELECTED FACILITIES OPERATIONS IN FY2001

This chapter of the Annual Review provides more detailed information on each of the 34 "Selected Facilities" that DOE analyzed in the SNL/NM Site-Wide Environmental Impact Statement (SWEIS). This review includes facility descriptions and a summary of current operations, including any changes to facilities and operations that occurred in FY2001. Comparative data from the SNL/NM SWEIS are also provided (DOE, 1999).

4.1 SNL/NM Technical Area I (TA-I) and TA-II Selected Facilities

The following sections provide brief descriptions of each selected facility in TA-I and TA-II, including a summary of current operations and capabilities. Specific emphasis is given to operations conducted in FY2001.

4.1.1 Advanced Manufacturing Processes Laboratory (AMPL)

The AMPL is a one-story structure with a basement and is located on an area covering more than 2 acres (ac) (0.8 hectares [ha]). The AMPL includes 138,253 square feet (ft^2) (12,843 square meters [m^2]) of research and support space.

Current Operations and Capabilities

Capabilities at the AMPL include prototype creation and limited manufacturing of specialized components of nuclear weapons (including neutron generator components). Manufacturing technology development at the AMPL is focused on enhancing capabilities in engineering hardware manufacture, emergency and specialized production of weapon hardware, manufacturing processes, and design and fabrication of unique production equipment.

Activities at the AMPL are typically laboratory and small-scale operations involving materials technology, fabrication, prototyping, and process research. Operations include but are not limited to development of processes utilizing plastics and organics, nonexplosive powders, adhesives, potting compounds, ceramics, glass, laminates, microcircuits, lasers, machine shop equipment, electronic fabrication, multichip modules, thin-film brazing and deposition, and plating. Other activities include materials characterization, mechanical measurement, and calibration mechanical engineering.

(Kuzio, 2001; SNL, 1998, 1999c; Zich, 2000)

Summary of Advanced Manufacturing Processes Laboratory Operations in FY2001

In FY2001, operations at the AMPL, including advanced manufacturing techniques, totaled 312,000 hours and remained essentially unchanged since the SWEIS analyses. Information in Section 4.7 shows that FY2001 material inventories, material consumption, emissions, and process requirements were unchanged compared to the SWEIS expanded operations alternative.

(SNL, 2002i)

4.1.2 Explosive Components Facility (ECF)

The ECF, a low-hazard, nonnuclear facility located near TA-II, is a self-contained, secure site that affords maximum protection for adjacent facilities and the environment. The complex includes a main building of ~100,308 ft^2 (9,319 m^2), six explosive storage magazines, plus service drives and parking areas.

(Kuzio, 2001)

Current Operations and Capabilities

The ECF consolidates numerous ongoing activities relating to SNL/NM's mission in energetic component research, testing, development, and quality control. In operation, the ECF facilitates the coordination of these activities to enhance safety and productivity.

Specific activities at the ECF include physical and chemical testing of explosives, pyrotechnics, and propellants. The ECF also supports stockpile surveillance of these energetic materials. Research and development at the ECF involves advanced explosive components, neutron devices, and batteries.

(SNL, 2002i)

Summary of Explosive Components Facility Operations in FY2001

During FY2001, the ECF continued to support work performed at the Neutron Generator Facility (NGF) and research and development performed on energetic components. Activities included research, testing, development, and quality control of neutron generators, explosives, chemicals, and batteries. FY2001 operations at the ECF included neutron generator tests, 600 explosive tests, 900 chemical analyses, and 55 battery tests. Section 4.7 shows that FY2001 material inventories, material consumption, emissions, and process requirements were well within the parameters analyzed for the SWEIS expanded operations alternative. An additional 1,600 ft^2 (150 m^2) of office space was added to the facility in FY2001.

(SNL, 2002i)

4.1.3 Integrated Materials Research Laboratory (IMRL)

The IMRL is comprised of 93,667 ft^2 (8,702 m^2) of office space and 52,292 ft^2 (4,860 m^2) of laboratory space, for a total of 145,959 ft^2 (13,560 m^2) of net floor space. This four-story concrete building has a full basement and a mechanical penthouse. On the penthouse and roof, exhaust systems vent chemical vapors from the labs to the outdoors.

Summary of Integrated Materials Research Laboratory Operations in FY2001

IMRL operations continued at its current capacity of ~395,454 hours per year and remained unchanged compared to the SWEIS analyses. Section 4.7 shows FY2001 material inventories, material consumption, emissions, and process requirements were at or within parameters analyzed for the SWEIS expanded operations alternative. In FY2000 hazardous waste generation increased to 7,336 lb (3,347 kg). This increase resulted from disposal of excess chemicals and represented a 67-percent increase above the estimated amount for the SWEIS expanded operations alternative. However, FY2001 hazardous waste generation decreased to 5,226 lb (2,373 kg), in an effort to return to levels that are within the parameters analyzed for the SWEIS expanded operations alternative. In addition, the IMRL eliminated processes that used chlorine gas and boron trichloride gas and obtained a permit from the City of Albuquerque to allow for disposal of nonhazardous sterile biowaste in the sanitary sewer.

(Kuzio, 2001; SNL, 1999c)

Current Operations and Capabilities

The IMRL provides offices and laboratory space for conducting materials and advanced components research, including lab studies in chemistry, physics, and alternative energy technologies. Materials studied at the IMRL include ceramics, organic polymers, alloys, and electronic components.

Research at the IMRL enables development of new materials for government and industrial needs, and ranges from the atomic scale, through the development of electronic devices, to full-scale mechanical components. Work involves technology transfer in areas of operational hazards associated with energetic materials, advanced initiation and fuze development, munitions life-cycle engineering, hard target penetration, and computer simulation.

(Davis, 2000; SNL, 2002i)

4.1.4 Microelectronics Development Laboratory (MDL)

The MDL, near TA-I, is a multifloor structure with a basement, is comprised of 94,621 ft^2 (8,790 m^2), and includes more than 200 offices, numerous storage areas, and 77 laboratories. The numerous light labs provide work environments primarily for wafer test equipment, die packaging, scanning electron microscopy, device radioactive source exposure, and device inspection.

(Kuzio, 2001)

Current Operations and Capabilities

The MDL supports research and development in state-of-the-art microelectronics production methods. Projects performed in the MDL may combine manufacturing techniques currently available at the prototype level. These activities include research and development on microelectronic devices for nuclear weapon applications. MDL's limited production capability of radiation-hardened microelectronics could serve as backup to private industry.

The MDL also supports ongoing efforts between DOE and the U.S. Department of Defense (DoD) to transfer the technology base resident at the DOE national laboratories for the development of advanced, cost-effective, nonnuclear munitions.

MDL activities also entail fabrication (integrated circuits, microsensors/controllers, and micromachines), study and improvement of silicon semiconductor processing, product development for microelectronic systems, corrosion studies, and development of new processes and prototypes, including miniature fuel cells and fuel processors.

(SNL, 2002i)

Summary of MDL Operations in FY2001

In FY2001, the MDL continued research and development activities on silicon-based microelectronic devices for nuclear weapons. Microtechnology development and engineering activities included integrated circuit and wafer production; the MDL produced 5,000 wafers in FY2001. The total level of MDL activities, summarized in Section 4.7, shows that FY2001 material inventories, material consumption, emissions, and process requirements were well within parameters analyzed in the SWEIS expanded operations alternative.

DOE anticipates that new technologies and manufacturing processes will be required to meet future growth. In FY2000, DOE prepared an environmental assessment and associated finding of no significant impact (FONSI) for the proposed construction and operation of the Microsystems and Engineering Sciences Applications (MESA) Complex. Construction of MESA is necessary to meet required expanded wafer production at MDL and replace the Compound Semiconductor Research Laboratory (CSRL). Proposed planning for the facility continued in FY2001.

(SNL, 2002i)

4.1.5 Neutron Generator Facility (NGF)

The NGF is a low-hazard, nonnuclear facility located in a two-story structure with a basement, in TA-I. Most processing and assembly operations take place in this building, although various support operations occur elsewhere, such as the ECF, which houses the neutron generator timer-driver and mounting hardware attachment, and packaging and explosive functional testing of neutron generators (SNL, 1997a).

Current Operations and Capabilities

Operations at the NGF include fabrication of neutron generators and prototype switch tubes. SNL/NM provides experimental testing and production-lot sample testing of explosive neutron generators and 100-percent functional testing of electronic neutron generators. Electronic generators are reusable; when tested, they typically do not generate waste. Explosive generators are one-use items that are tested in a protective enclosure; testing results in the generation of classified mixed waste.

(Stiles, 2000; SNL, 2002i)

Summary of Neutron Generator Facility Operations in FY2001

During FY2001, the NGF continued to fabricate neutron generators and neutron tubes. This total is well below the projected number of neutron generators per year (and associated neutron and switch tubes) included in the SWEIS expanded operations alternative. Support activities included manufacturing, testing, and product development techniques and processes. The total level of activities, summarized in Section 4.7, shows that FY2001 material inventories, material consumption, emissions, and process requirements were well within parameters analyzed in the SWEIS expanded operations alternative.

In FY2001, several building modifications were completed at the NGF, to meet future production needs. The NGF received the most extensive renovations, with approximately 5,000 ft^2 of floor space being modified for more flexible usage, as well as upgrades to building systems for development and analytical work to support neutron generator production. The NGF also received a new braze furnace, which replaced an existing development furnace that was relocated to the Advanced Manufacturing Prototype Facility. In addition, both buildings received security upgrades.

(SNL, 2002i)

4.2 Physical Testing and Simulation Facilities (TA-III)

4.2.1 Centrifuge Complex

The Centrifuge Complex in TA-III is a low-hazard, nonnuclear facility comprised of a 29-ft (8.8-m) indoor centrifuge and an adjacent 35-ft (11-m) outdoor centrifuge.

(DOE, 1997a; Kuzio, 2001)

Current Operations and Capabilities

The Centrifuge Complex is used for acceleration testing of large objects—weapon systems, satellite systems, reentry vehicles, and rocket motors. It is also used by SNL Energy and Environment programs to certify designs in transportation technology.

For continuous acceleration tests, objects are attached to one end of a boom that rotates around a central shaft. Vibration and acceleration testing can be combined by mounting an electrodynamic shaker on the arm of the 29-ft (8.8-m) centrifuge. Items weighing up to 56 lb (25 kg) can be vibrated while at 50 *g* of acceleration.

(DOE, 1997a; SNL, 2001j)

Summary of Centrifuge Complex Operations in FY2001

During FY2001, the Centrifuge Complex completed 21 centrifuge tests. This activity level is well within the number of tests (120 centrifuge tests and 100 impact tests) analyzed in the SWEIS expanded operations alternative. Section 4.7 shows FY2001 material inventories, material consumption, emissions, and process requirements were well within parameters analyzed in the SWEIS expanded operations alternative.

(SNL, 2002i)

4.2.2 Drop/Impact Complex

The Drop/Impact Complex, a low-hazard nonnuclear facility in TA-III, is comprised of two drop towers; a 185-ft (56-m) tower (next to a hard surface) and a 300-ft (91-m) tower (next to a water-filled pool that is 120 ft [37 m] wide, 188 ft [57 m] long, and 50 ft [15 m] deep). A 600-ft (182-m)-long rocket sled track is located at the end of the pool opposite the tower. The sled track supports rocket-accelerated impact tests into the pool.

Current Operations and Capabilities

The 185-ft (56-m) drop tower is used to drop test items weighing up to 9,000 lb (4,091 kg) onto prepared surfaces such as dirt, reinforced concrete, or steel plate. A cable stretched over the top of the tower to anchors on the ground, allows test items weighing up to 2,000 lb (909 kg) to slide down a carriage, and be released to fall onto a target.

A guidewire system on the 185-ft (56-m) drop tower is used to drop punch-type structural shapes to impact on shipping containers. Test items weighing up to 3,000 lb (1,364 kg) can be targeted into the water pool from the 300-ft (91-m) drop tower, and either dropped or accelerated by rocket-assisted pull-down to strike the water at velocities up to 600 ft per second (f/s) (182 meters per second [m/s]), and 30° to 90° angles. Submersion tests are conducted in the water pool. Explosive charges up to 1 lb (0.45 kg) may be detonated underwater to test blast effects.

(DOE, 1997a; Kuzio, 2001; SNL, 2002i)

Summary of Drop/Impact Complex Operations in FY2001

During FY2001, the Drop/Impact Complex activities focused on drop test, design verification, and performance assessments. The Drop/Impact Complex completed three drop tests, but no water impact, submersion, or underwater blast tests in FY2001. This activity level is well within the number of tests (50, 20, 5, and 10, respectively) analyzed in the SWEIS expanded operations alternative. Section 4.7 shows FY2001 material inventories, material consumption, emissions, and process requirements were within parameters analyzed in the SWEIS expanded operations alternative.

(SNL, 2002i)

4.2.3 Sled Track Complex

The Sled Track Complex consists of numerous buildings and structures in TA-III. The main building is a total of 5,489 ft^2 (510 m^2) in size and is divided into three areas: a control room (912 ft^2 [85 m^2]), a workshop area (2,875 ft^2 [267 m^2]), and a highbay assembly area (936 ft^2 [87 m^2]). The Sprint Building and the Explosives Assembly and Rocket Motor Conditioning Facility provide support to activities in the main building.

The main sled track is a 10,000-ft (3,048-m) concrete beam supporting two continuously-welded steel rails at a 22-in. (56-cm) gauge with a 1-ft^2 (0.09-m^2) trough (cast in the concrete beam between the rails). For recoverable sleds, scoops attached underneath drag against water in the trough, thus providing a controllable braking mechanism. The Complex also includes a rocket launcher with a 70-ft (21-m) launch rail. Located just southeast of the main sled track, the rail is used to launch test items into targets. A portable 10-ft (3-m) beam mounted on a trailer is also used at the Sled Track Complex to launch free-flight, rocket-powered, parachute test vehicles.

(DOE, 1997a; Kuzio, 2001; West, 1997)

Current Operations and Capabilities

The Sled Track Complex provides a controlled environment for high-velocity impact, aerodynamic, and acceleration testing of small and large items, simulating high-speed impacts of weapon shapes, substructures, and components to verify design integrity, performance, and fuzing functions. The facility also is used to subject weapon parachute systems to aerodynamic loads to verify parachute design integrity and performance. The Complex provides the capability to verify designs in transportation technology, reactor safety, and Defense Programs (DP) transportation systems.

(DOE, 1997a; SNL, 2002i; West, 1997)

Summary of Sled Track Complex Operations in FY2001

During FY2001, the Sled Track Complex performed 12 rocket sled tests, 10 explosive tests, 3 rocket launches, and 22 free-flight launches. This activity level is well within the number of tests (80, 239, 24, and 150, respectively) analyzed in the SWEIS expanded operations alternative. Section 4.7 shows FY2001 material inventories, material consumption, emissions, and process requirements were well within parameters analyzed in the SWEIS expanded operations alternative.

(SNL, 2002i)

4.2.4 Terminal Ballistics Facility (TBF)

The TBF in TA-III is a low-hazard facility that includes a main building, two smaller buildings, and four explosive storage magazines. The main building (2,748 ft^2 [255 m^2]) houses a small machine shop, office space, a control area, and an indoor firing range. One ancillary building is used for the assembly of large propellant charges and temperature conditioning of propellants. The four magazines are used for long-term storage of propellants and explosives.

An outdoor, large-caliber gun range has a 155-millimeter (mm) "Long Tom" artillery that is permanently mounted in a revetment adjacent to the main building and is aimed in a southerly direction.

(DOE, 1994a, 1997a; Kuzio, 2001)

Current Operations and Capabilities

The TBF provides secure, remote, indoor and outdoor test facilities for ballistics studies and solid-fuel rocket motor tests. Indoor testing of firearms and projectiles is conducted from a fixed stand to provide controlled firing of ammunition (= 20 mm). Various guns may be used for projectile or penetration tests, with targets placed up to ~1,000 ft (~305 m) south of the main building.

For outdoor thrust tests, a rocket is oriented vertically on the static test stand, with the nose resting on a load cell (to measure thrust force during the propellant burn cycle). Spin rockets are tested using a horizontal fixture with a load cell. Munitions testing done outdoors in explosive-rated chambers may include both explosives and chemicals.

(DOE, 1994a, 1997a; SNL, 2002i)

Summary of Terminal Ballistics Facility Operations in FY2001

During FY2001, the TBF completed 50 projectile impact tests and 25 propellant tests. This activity level is well within the number of tests (350 and 100, respectively) analyzed in the SWEIS expanded operations alternative. Section 4.7 shows FY2001 material inventories, material consumption, emissions, and process requirements were well within parameters analyzed in the SWEIS expanded operations alternative. However, expenditures for the TBF exceeded the SWEIS expanded operations alternative. This was due to a one-time rework of the data collection system, which resulted in the purchase of cables and connectors. The TBF obtained a burn permit for using thermite in FY2001.

(SNL, 2002i)

4.3 Accelerator Facilities (TA-IV)

4.3.1 Advanced Pulsed-Power Research Module (APPRM)

The APPRM (southwest highbay) is a single-pulse accelerator used to evaluate new pulsed-power components and component alignments to improve future accelerator performance. The building that houses the APPRM in TA-IV is a multifloor facility with a basement and contains 87,541 ft^2 (8,133 m^2). The APPRM occupies 13,000 ft^2 (1,208 m^2) of floor space in the highbay. The APPRM is also a test bed for other projects and can be used for conducting general pulsed-power research.

(DOE, 1996; Sullivan et al., 1996; Kuzio, 2001)

Current Operations and Capabilities

In FY2001, activities at the APPRM continued to involve the study of power storage, high-voltage switching, and power flow for advanced applications. Additionally, APPRM activities continued for the development of technologies to enhance current facility capabilities or support new designs. Work includes development of advanced pulsed-power sources for future incorporation into machines to be used for weapon effects and weapon physics experiments. Experiments on inertial confinement fusion are not presently being conducted at the facility. However, a breakthrough in gas switch design for the APPRM would eliminate the shock generated in the module and has validated the application of this technology for testing the design of a potential (future) pulsed-power facility, such as the X-1.

(SNL, 2002i)

Summary of APPRM Operations in FY2001

During FY2001, the APPRM operations involved 300 shots. The SWEIS expanded operations alternative analyzed up to 2,000 accelerator shots per year at the APPRM facility. Section 4.7 shows most FY2001 material inventories, material consumption, emissions, and process requirements were below parameters analyzed in the SWEIS expanded operations alternative.

In FY2001, SNL/NM installed a new oil tank for the APPRM, which accounts for the increase in insulator oil. The new tank will provide research and development for the Z Accelerator refurbishment; however, no shots were fired during FY2001. In addition, a wall was added to separate the south side of the highbay from the north side.

(SNL, 2002i)

4.3.2 High-Energy Radiation Megavolt Electron Source III (HERMES III)

The HERMES III is housed in the 55,000-ft^2 (5,110-m^2) Simulation Technology Lab. This multifloor building with a basement is 76,159 ft^2 (7,075 m^2) in size, accommodating 22 offices, two shop areas, four administrative areas, 16 storage areas, and 36,120 ft^2 (3,356 m^2) of lab space.

(Fine, 1996; Kuzio, 2001)

Current Operations and Capabilities

HERMES III is a high-energy, inductive voltage adder (IVA) accelerator, producing an intense electron beam which, when it interacts with a grounded bremsstrahlung converter, generates intense gamma-ray output with an 18-mega-electron volt (MeV) endpoint voltage. HERMES III can provide high-fidelity simulation over very large areas, with applications including electronics testing for component and weapon system development, to ensure operational reliability of weapon systems in radiation environments caused by nuclear explosions. HERMES III may also be operated in a reverse-polarity mode, for experiments on extraction ion diodes, and radiography research and development. The accelerator is also used to study radiation transport through matter, radiation deposition in materials, damage in components and circuits as they age past expected lifetimes, and damage mitigation.

(Fine, 1996; SNL, 2002i; Sullivan, 1995; Sullivan et al., 2000)

Summary of HERMES III Operations in FY2001

During FY2001, operations at HERMES III involved 288 shots, well within the 1,450 shots per year analyzed in the SWEIS expanded operations alternative. Section 4.7 shows FY2001 material inventories, material consumption, emissions, and process requirements were well within parameters analyzed in the SWEIS expanded operations alternative.

(SNL, 2002i)

4.3.3 Radiographic Integrated Test Stand (RITS)

SNL/NM continued development in TA-IV of a new accelerator called RITS that will be installed in place of the SABRE accelerator in the same highbay. Installation of the RITS began in FY2001; however, the facility is not expected to be fully operational until 2003.

In its initial configuration, RITS would operate at 4 megavolts (MV), 175 kilo-amperes (kA), and 50 nanoseconds (ns), and expand to 16 MV in several phases. The RITS would be configured to provide various output options, including two sequential half-voltage pulses, a single full-voltage pulse, and twin-axis, half-voltage single pulses. The RITS would consist of a transformer-oil-filled tank containing a high-voltage Marx generator and transfer capacitor, three water-filled pulse-forming lines, an oil-filled transmission line, and a vacuum transmission line that is magnetically insulated, terminating in an x-ray-generating diode load. The new accelerator would use the existing SABRE oil storage tank and piping to and from the tank.

(Harris, 2000; Kuzio, 2001)

Current Operations and Capabilities

The RITS is planned as an accelerator and intense electron-beam testbed to develop and demonstrate the capabilities required for Subcritical Experiment (SCE) radiography. The SCEs will provide experimental benchmarking for three-dimensional numerical models of nuclear weapon primaries. The result, weapons code validation, will be used to assess the performance and safety of the enduring stockpile and to qualify remanufacture technologies and life-cycle engineering.

RITS accelerator operations and capabilities would be similar to those of the SABRE accelerator and well within the scope of the nearby HERMES III accelerator. The possible future addition of a contained explosive firing capability will significantly modify facility operations and capabilities, and will be addressed at the time of such an upgrade proposal.

(SNL, 2002i)

Summary of RITS Operations in FY2001

SNL/NM began installation of the RITS in FY2001. Once operational, RITS is expected to increase operations up to a maximum of 800 tests per year. Operational requirements are presented in Section 4.7 and are consistent with the SWEIS analyses.

(SNL, 2002i)

4.3.4 Repetitive High Energy Pulsed-Power Unit I (RHEPP I)

The RHEPP I facility includes a Marx generator, a pulse-forming line (PFL), a linear induction voltage adder (LIVA), and a vacuum diode load (VDL). RHEPP I and HERMES III are housed in the same building. The RHEPP I system consists of a 150-kilowatt (kW) power supply, four stages of linear induction voltage addition, and the vacuum diode.

(Kuzio, 2001; Weber, 1999)

Current Operations and Capabilities

RHEPP I, the first SNL/NM RHEPP-type accelerator, was used for basic technology development of the RHEPP technical concept, and is now used for applications at lower energies. It is also still used for technology development and some experimental work with materials and organic sterilization processes. The RHEPP I facility currently functions to develop technology for continuous operation of pulsed-power systems that demonstrate high-average-power, ion-beam outputs at energies up to 1 MeV and power up to 45 kW, suitable for industrial applications (Weber, 1999). Activities at RHEPP I include development of pulsed-power materials-processing techniques for weapon applications and development of applications related to biological and chemical agent defeat.

(SNL, 2002i)

Summary of RHEPP I Operations in FY2001

During FY2001, RHEPP I completed 2,494 tests, in either the single or repetitive pulse modes. Section 4.7 shows FY2001 material inventories, material consumption, emissions, and process requirements were well within parameters analyzed in the SWEIS expanded operations alternative.

(SNL, 2002i)

4.3.5 Repetitive High Energy Pulsed-Power Unit II (RHEPP II)

The RHEPP II facility houses the RHEPP II accelerator, a 2.0-MeV, 25 kA, pulsed accelerator. The RHEPP II facility is located within a multifloor concrete building with a basement. The building contains 87,541 ft^2 (8,133 m^2). Approximately 73,422 ft^2 (6,821 m^2) is lab space, including a 58,088-ft^2 (5,396-m^2) highbay. RHEPP II components include the microsecond pulse compressor (MPC), a water-insulated PFL, LIVA, and a high-power electron beam diode. The system consists of a 750-kW power supply, seven stages of magnetic pulse compression, ten stages of linear induction voltage addition, and a vacuum diode.

(DOE, 1996; Kuzio, 2001; Weber and Zawadzkas, 1996a)

Current Operations and Capabilities

The RHEPP II supports the development of radiation-processing applications using high-dose-rate electron or x-ray beams. The RHEPP II accelerator is also a test bed for the continued development of high-power magnetic switches and repetitive, magnetically insulated transmission lines (MITLs) (DOE, 1996; Weber and Zawadzkas, 1996a).

The accelerator is also used to develop pulsed-power technology and applications, including developing advanced accelerators for biosterilization. RHEPP technology has been used for ion beam surface treatment (IBEST) to harden material surfaces and for advanced research that supports sterilization projects for organic materials (e.g., food products and lumber).

(Martinez, 1999; SNL, 2002i)

Summary of RHEPP II Operations in FY2001

During FY2001, activities included testing of high-power magnetic switches and specialty transmission lines. RHEPP II operations did not include any accelerator tests in FY2001. The SWEIS analyzed up to 800 tests per year at the RHEPP II facility. Section 4.7 shows FY2001 RHEPP II material inventories, material consumption, emissions, and process requirements were well within parameters analyzed in the SWEIS expanded operations alternative.

(SNL, 2002i)

4.3.6 Sandia Accelerator for Beam Research (SABRE)

SABRE was a pulsed accelerator located within the Simulation Technology Laboratory in TA-IV, and was dismantled in FY2001.

The SABRE accelerator facility included an oil tank, two screen rooms, a lead- and concrete-shielded test cell, and several work areas. The 30,000-gal (114,000-l) accelerator oil tank contained two Marx generators (3.6-MeV and 50-kV), a gas switch, an intermediate storage capacitor, and high-voltage distribution lines.

(Harris, 2000; Knowles and Zawadzkas, 1995; Kuzio, 2001)

Current Operations and Capabilities

The SABRE facility was a pulsed-power-driven IVA accelerator that supported extraction diode research, weapon component development (simulation of thermal-mechanical shock induced by x-ray deposition), and development and assessment of radiographic sources. Activities at SABRE involved survivability testing of nuclear weapon subsystems and components and technology development to provide radiographic characterization techniques. SABRE supported the light ion program in investigating extraction diodes and MITL coupling; testing surface and subsurface cleaning, improved vacuum conditions, and advanced ion sources; and studying lithium ion transport.

(Molina, 1999; SNL, 2002i)

Summary of SABRE Operations in FY2001

During FY2001, SABRE performed 150 shots to provide x-ray and gamma-ray effects testing on pulsed-power technologies, fusion systems, weapons systems, computer science, flight dynamics, satellite systems, and robotics. The FY2001 activity level is within the 400 shots analyzed in the SWEIS expanded operations alternative. Hazardous waste generation remained at zero in FY2001. Section 4.7 shows FY2001 material inventories, material consumption, emissions, and process requirements were basically unchanged since the SWEIS analyses. Work began in FY2001 to replace the SABRE with the RITS accelerator.

(SNL, 2002i)

4.3.7 Saturn

The Saturn accelerator in TA-IV is housed in a multifloor facility nearly 42,087 ft^2 (3,910 m^2) in size. The facility is comprised of a laboratory building (highbay, office space, shop areas, light labs, a mechanical room, radiation exposure cell, and basement), storage tanks, and transfer systems for large quantities of transformer oil and deionized water. The highbay is approximately three stories high, with a 1,000-ft^2 (93-m^2) screen room.

(Fine, 1988; Kuzio, 2001; Miller, 2000)

Current Operations and Capabilities

The Saturn accelerator produces x-rays to simulate the radiation effects of nuclear weapon detonation on electronic and material components, as a pulsed-power and radiation source, and as a diagnostic test bed. Areas of application include satellite systems, Strategic Defense Initiative space assets, and reentry vehicle and missile subsystems (Miller, 2000). Activities at Saturn support stockpile stewardship programs in the development and survivability testing of nuclear weapon subsystems and components by providing hostile radiation environmental testing, including simulating the x-rays produced by a nuclear weapon detonation. Saturn is used for demonstrating high-yield fusion in the laboratory.

(SNL, 2002i)

Summary of Saturn Operations in FY2001

During FY2001, Saturn performed 111 shots. The SWEIS expanded operations alternative analyzed up to 500 shots per year at the Saturn facility. Section 4.7 shows FY2001 material inventories, material consumption, emissions, and process requirements were well within parameters analyzed in the SWEIS expanded operations alternative.

(SNL, 2002i)

4.3.8 Short-Pulse High Intensity Nanosecond X-Radiator (SPHINX)

The SPHINX accelerator facility in TA-IV is a concrete-shielded enclosure adjacent to the Saturn accelerator. The accelerator occupies ~700 ft^2 (65 m^2) of the building and consists of an 18-stage, low-inductance Marx generator, two oil PFLs and a vacuum PFL, and radiation barriers. The radiation barrier is a concrete-shielded enclosure with a movable skyshine shield attached to the top of the transmission line/dioide.

(Kuzio, 2001; Miller, 1999)

Current Operations and Capabilities

SPHINX provides radiation environments for testing DOE components of nuclear weapons and for confirming codes used in the certification of nuclear weapons components. SPHINX can operate in two distinct modes—as a bremsstrahlung x-ray source and as an electron beam source. In the bremsstrahlung (x-ray) mode, researchers study the response of electronics to pulsed, high-energy, x-ray environments. The electron beam mode is used to study the thermostructural response of materials to pulsed radiation. Current activities at SPHINX involve research and development work associated with high-shot-rate, hot x-ray effects simulation to test components that require small-area exposure. The electron beam mode is used to support development work for tactical and strategic satellite systems.

(Nickerson et al., 1995; SNL, 2002i)

Summary of SPHINX Operations in FY2001

During FY2001, the SPHINX performed 1,599 shots, well within the analysis of the SWEIS expanded operations alternative of up to 6,000 shots per year. Section 4.7 shows FY2001 material inventories, material consumption, emissions, and process requirements remained unchanged since the SWEIS analyses.

(SNL, 2002i)

4.3.9 Tera-Electron Volt Energy Superconducting Linear Accelerator (TESLA)

The TESLA accelerator facility in TA-IV, formerly known as the Magnetically Insulated Transmission Experiment (MITE) accelerator, is an 11,526-ft^2 (1,071-m^2) single-story building divided into two sections, a highbay area and an office/lab area. The accelerator consists of two oil tanks, a water tank, and a concrete-shielded test cell. The test cell includes a vacuum storage inductor, a magnetically controlled plasma opening switch, and an electron beam load. Each oil tank contains 10,000 gal (37,850 l) of transformer oil and a Marx generator, which can store a maximum of 740 kJ in 48 capacitors, and is equipped with a mechanical shorting system.

(Kuzio, 2001; Weber and Zawadzkas, 1996b)

Current Operations and Capabilities

The TESLA facility operates to test plasma opening switches for pulsed-power drivers (Weber and Zawadzkas, 1996b). The primary operating mode of TESLA produces a pulse that lasts ~40 ns, with 150 kJ of electrical energy and 700-kA peak diode current at a peak voltage of 5 MV or less. TESLA produces ionizing radiation in the vacuum chamber region in the form of intense prompt radiation (bremsstrahlung). In this primary operating mode, an ion beam is not produced, except incidentally in the plasma opening switch (Weber and Zawadzkas, 1996b).

(SNL, 2002i)

Summary of TESLA Operations in FY2001

During FY2001, the operating levels at the TESLA involved 50 shots. Section 4.7 shows most FY2001 material inventories, material consumption, emissions, and process requirements were well within parameters analyzed in the SWEIS expanded operations alternative.

In FY2001, insulator oil inventory remained at a higher level than was analyzed in the SWEIS expanded operations alternative. This was the result of adding a new 10,000-gal (37,850-l) tank in FY2000. Hazardous waste generation, while remaining at levels that were higher than estimated in the SWEIS expanded operations alternative, decreased from 330 lb (150 kg) in FY2000 to 220 lb (100 kg) in FY2001.

(SNL, 2002i)

4.3.10 Z Accelerator

The Z Accelerator is located in TA-IV in a multifloor, masonry building with a basement. The building provides 39,487 gross ft^2 (3,668 m^2) of which 35,429 ft^2 (3,291 m^2) is lab space. The facility includes the accelerator highbay (mezzanine, 0-ft level, 10-ft level, and 25-ft level), support area highbays, laser and facility support systems (12-ft level), water and oil tank farms, lowbay light labs and control room, and the gas house. The accelerator is located in a circular tank, ~33 m (108 ft) in diameter, and 6 m (20 ft) high.

(Harris and Sullivan, 1996, 2000; Kuzio, 2001)

Current Operations and Capabilities

The multi-use Z Accelerator supports the Inertial Confinement Fusion Program and the High-Energy/Density Physics Program for stockpile stewardship. Operating on the principle of pulsed power, the Z Accelerator stores electrical energy over a period of minutes, then releases that energy in a concentrated burst to produce a single, extremely short and powerful pulse that can be focused on a target (Harris and Sullivan, 1996).

Z Accelerator programs support studies of radiation transport, radiation drive symmetry, radiation hydrodynamics, hydrodynamic instabilities, shock physics, equations of state, opacity, and capsule implosion physics. These studies support both near-term stockpile stewardship and a DOE decision to achieve high yield for weapon physics tests and a warm x-ray environment for radiation-effects studies. For radiation-effects research, the Z Accelerator provides x-ray line radiation generated by imploding z-pinches, that can simulate the materials' response to an unshielded x-ray threat from a weapon.

(Harris and Sullivan, 1996; Harris, 2000; SNL, 1999c, 2002i)

Summary of Z Accelerator Operations in FY2001

During FY2001, the Z Accelerator performed 162 test shots. This activity level is well within the 350 firings analyzed in the SWEIS expanded operations alternative. Section 4.7 shows that for FY2001, the majority of material inventories, material consumption, emissions, and process requirements were well within parameters analyzed in the SWEIS expanded operations alternative. Inventory and consumption of depleted uranium (DU) used in insentropic experiments exceeded parameters analyzed in the SWEIS expanded operations alternative. In FY2001 planned experiments, using an increased amount of DU, began in the Z Accelerator. This increased use of DU at the Z Accelerator was documented in an environmental checklist review.

In FY2001, the Z Beamlet Laser System (ZBL) came on line as a new capability. The ZBL is a 3-kJ laser which that generates a laser beam which is piped into another building and used as a laser backlighting diagnostic. Also in FY2001, the MITL grinding enclosure was installed to control the metallic dust that is generated during grinding of the MITLs. This also helped to control any potential exposure to beryllium or other hazardous materials that may be used in Z experiments.

(SNL, 2002i)

4.4 Reactor Facilities (TA-V)

4.4.1 Annular Core Research Reactor (ACRR) Facility (Pulse Configuration)

The ACRR facility, located in TA-V, is part of a larger complex that includes two other major structures. One 13,640-ft^2 (1,267-m^2) structure comprises the reactor room, lowbay, control room, building utilities, several small laboratories, and support staff offices. The reactor room is 2,002 ft^2 (~186 m^2) and 31 ft (9.4 m) high. Important design features of the ACRR include a small pool-type reactor that is under ~18 ft (6.2 m) of water, cranes for the remote handling of irradiated experiment packages, and a high-efficiency particulate air (HEPA)-filtered, ventilated highbay.

In the pulse configuration, the ACRR is a water-moderated and reflected low-power research reactor that uses enriched uranium dioxide-beryllium oxide (UO_2BeO) fuel elements, arranged in a closely packed hexagonal lattice, around a central experiment cavity. The highbay is constructed of concrete block walls reinforced by vertical steel columns that support a sheet-metal roof, and thus is a confinement structure rather than a containment structure.

(Kuzio, 2001; Naegeli et al., 1999; SNL, 1996a)

Current Operations and Capabilities

The ACRR facility (pulse configuration) provides neutron and sustained gamma environments for the evaluation of experiments, including those for Defense Programs (DP) testing of component electronics, and reactor safety research.

Reactor features include a dry cavity in the central core region and a radiography tube, and it is capable of producing high-energy neutrons in the dry cavity over a very short time period. Four types of experiments can be conducted in the ACRR pulse configuration mode:
(1) irradiation of solids within the radiography tube or other dry cavity, (2) radiography experiments, (3) irradiation of solids or gases within the pool and within or adjacent to the core, and (4) irradiation of solids or gases within the dry central cavity or other dry cavity.

(SNL, 2002i)

Summary of ACRR Pulse Mode Operations in FY2001

In FY2001, the ACRR continued to provide neutron and sustained gamma environments for the completion of five test series. The ACRR was reconfigured for pulse mode when the medical isotope program was suspended. In July of FY2001, the *Supplement Analysis, SWEIS for SNL/NM, Reestablishing Long-Term Pulse Mode Testing Capability at the Annular Core Research Reactor, Sandia National Laboratories, New Mexico,* was prepared to address the long-term environmental effects of reestablishing long-term pulse mode testing at the ACRR (DOE, 2001). It was determined by DOE that the additional pulse mode testing, including the production of small quantities of radioisotopes and support to other nuclear research programs, would not constitute substantial changes to measures proposed in the SWEIS relevant to environmental concerns. Section 4.7 shows that most FY2001 material inventories, material consumption, and process requirements were within parameters analyzed in the SWEIS expanded operations alternative; however, radioactive air emissions (argon-41 [Ar-41]) increased to 39 curies (Ci) in FY2001. This increase was included in the supplement analysis, which was prepared for the pulse mode reconfiguration.

(SNL, 2002i)

4.4.2 ACRR (Isotope Production Configuration)

See Section 4.4.1 for the facility description (Kuzio, 2001; Naegeli et al., 1999).

Current Operations and Capabilities

Although the ACRR facility can be used for the production of isotopes such as molybdenum-99 (Mo-99), whose daughter, technetium-99m (Tc-99m), is used in nuclear medicine applications, the isotope production program remained suspended in FY2001.

(SNL, 2002i)

Summary of ACRR Isotope Production Operations in FY2001

In FY2001, no medical isotopes were produced. Under original plans for medical isotope production, the ACRR would have produced medical and research radioactive isotopes. The ACRR would have been operated for 24 hours per day, 7 days per week, at a maximum power level of 4 megawatts (MW), (~35,000 MW-hours per year) to meet the entire United States' demand for Mo-99 and other isotopes such as iodine-125 (I-125), I-131, and xenon-133 (Xe-133). This would have required the irradiation of about 25 highly enriched uranium targets per week (1,300 per year).

(SNL, 2002i)

4.4.3 Gamma Irradiation Facility (GIF)

The original GIF shares the highbay with the ACRR in TA-V. This multifloor facility with a basement provides nearly 13,640 ft^2 (1,267 m^2) of space, including nearly 5,166 ft^2 (480 m^2) of lab space.

Main features of the GIF are the deep-water pool and two dry irradiation cells. The pool is a rectangular, reinforced-concrete structure with a stainless-steel liner. The pool's dimensions are 8 ft by 14.5 ft (2.4 m by 4.4 m), with a depth of 16 ft (4.9 m), mostly below ground, and a berm of ~3 ft (1 m) above floor level. It has an exposed surface area of 65 ft^2 (6 m^2) and a total water volume of ~13,000 gal (49,205 l). The GIF pool has been used to store spare fuel elements for the ACRR. Valved pass-through ports, which are located ~8 ft (2.4 m) below the surface of the reactor and GIF pools, serve to transfer fuel elements between the two facilities.

(Boldt et al., 2000; Kuzio, 2001; SNL, 1999c)

Current Operations and Capabilities

Future use of the original GIF is being assessed by SNL/NM and DOE. In the past, the facility provided high-intensity gamma-ray sources to irradiate experiments. Since no experiments were irradiated, the radioactive sources were safely stored in the deep-water pool under the cell.

Summary of Gamma Irradiation Facility Operations in FY2001

No tests were performed in FY2001. Section 4.7 shows FY2001 material inventories, material consumption, emissions, and process requirements were essentially zero. In the first quarter of FY2001, cobalt-60 (Co-60) sources were moved from the old GIF to the New GIF facility. This was documented in *Gamma Irradiation Facility (GIF) Safety Analysis Report* (Boldt et al., 2000) and *Technical Safety Requirements for the Gamma Irradiation Facility (GIF),(* Mahn, 2000).

(SNL, 2002i)

4.4.4 Hot Cell Facility (HCF)

Located in TA-V, the HCF is a Hazard Category 3, nonreactor nuclear facility in an underground structure.

Current Operations and Capabilities

The HCF remains in a standby status. Work was begun to modify the HCF from its original mission of support for DP testing to support of the DOE Isotope Production and Distribution Program; however, this work was discontinued when the medical isotope production program was suspended. Future applications for the HCF are being assessed by SNL/NM and DOE.

(SNL, 2002i)

Summary of Hot Cell Facility Operations in FY2001

In FY2001, the HCF remained in standby mode, and no medical isotopes were produced. Section 4.7 shows FY2001 material inventories, material consumption, emissions, and process requirements were essentially zero.

(SNL, 2002i)

4.4.5 New Gamma Irradiation Facility (New GIF)

The New GIF is a single-story, 12,450-ft^2 (1,157-m^2) structure located in the northeast quadrant of TA-V. The structure consists of a central highbay with an ancillary lowbay. The highbay houses three concrete test cells and a J-shaped water pool with a depth of 18 ft (5.5 m). The pool can store Co-60 or equivalent gamma-ray thermal sources in the form of pins that can be shared between the in-cell irradiation facilities and the in-pool irradiation facilities.

The New GIF has three irradiation cells. Test cell 3 is an 18-ft by 30-ft (5.5-m by 9.1-m) experiment cell, with two source elevators and an 18-ft (5.5-m)-wide movable wall for large vehicle access; test cells 1 and 2 are 10-ft by 10-ft (3-m by 3-m) irradiation cells for use with a high-intensity, adjustable Co-60 array. The design includes the capability to add lead lining to reduce gamma backscatter and, therefore, provide a high-fidelity cell.

(Kuzio, 2001; Mahn et al., 2000; Miller, 1998)

Current Operations and Capabilities

At the New GIF, gamma-irradiation experiments vary in test configuration, dose, and dose-rate level. The New GIF is divided so that two types of irradiation experiments (in-cell dry and in-pool wet) can be performed. General features and enhanced capabilities of the New GIF include configurable radiation sources, shielded windows for experiment observation during irradiation, and remote manipulators for experiment or source handling. Also, the New GIF provides in-pool irradiation fixtures to vary experiment configurations, a steam room for thermal cycling following radiation exposures, and overhead traveling cranes.

(Mahn et al., 2000; Miller, 1998)

Typically, irradiations performed in these facilities are at high dose rates, and short to intermediate durations lasting less than a day. At the in-pool facilities, radioactive sources are held in an irradiation fixture in deep water, where they remain stationary. Experiment canisters containing test units are immersed in the pool and positioned in preset locations in the irradiation fixture.

Summary of New GIF Operations in FY2001

With completion of construction, the New GIF began preparation to become operational in FY2001. Gamma-irradiation experiments may be performed under both dry and water-pool conditions. Capabilities would include studies in thermal and radiation effects, weapons component degradation, nuclear reactor material and components, and other nonweapon applications. Because no test hours were logged in FY2001, there were no impacts from New GIF operations, and material inventories, material consumption, emissions, and process requirements were essentially zero. However, in the first quarter of FY2001, Co-60 sources were moved from the old GIF to the New GIF facility. This was documented in *Gamma Irradiation Facility (GIF) Safety Analysis Report* (Boldt et al., 2000) and *Technical Safety Requirements for the Gamma Irradiation Facility (GIF),* (Mahn, 2000). It is estimated that, as the customer base increases, the New GIF will increase operational hours to the levels estimated in the expanded alternative in the SWEIS.

(SNL, 2002i)

4.4.6 Sandia Pulsed Reactor (SPR) Facility

The SPR Facility in TA-V includes 3,000 ft^2 (279 m^2) of space consisting of a reactor control room, reactor building, and auxiliary equipment and buildings to support reactor operations. Several storage vaults, which are integral units in adjacent buildings, are available for storing the reactor and fissionable and radioactive materials. The reactor building (660 ft^2 [61 m^2]) is a large, thick-walled, steel-reinforced concrete structure in the shape of a cylinder, with an outside diameter of 39 ft (~12 m), covered with a hemispherical shell.

(Estes, 1995; Kuzio, 2001)

Current Operations and Capabilities

When operational, the SPR-II and SPR-III fast-burst reactors provide near-fission spectrum radiation environments for testing that supports defense and nondefense activities. The primary facility mission has been to produce high-neutron fluence or pulsed high-neutron doses for testing electronic subsystems and components. Critical experiments are also conducted in the facility to support other programs (Estes, 1995; Miller, 1998). Currently, the reactors and spare fuel materials are being stored in an underground vault (the In-Ground Storage Vault [IGSV]), pending plans for the new underground reactor facility.

Critical assemblies can be built in the SPR Facility for short-term experiments on nuclear energy. Safety elements incorporated into the operation of these small assemblies (typically less than 1 MW) are similar to those of the SPR. The assemblies are temporary, with a much lower power of operation, and lower potential for dispersion of radioactive material.

(Harms, 2000; SNL, 2002i)

<u>Summary of Sandia Pulsed Reactor Operations in FY2001</u>

During FY2001, SPR Facility operations involved zero irradiation tests, due to the reactor having been placed in the IGSV at the end of FY2000. Section 4.7 shows most FY2001 material inventories, material consumption, emissions, and process requirements were within parameters analyzed in the SWEIS expanded operations alternative. No tests are planned for FY2002. In FY2003, the SPR will be returned to the SPR Facility and restored to operational status, pending opening of the Sandia Underground Reactor Facility (SURF).

(SNL, 2002i)

4.5 Outdoor Test Facilities

4.5.1 Aerial Cable Facility Complex

The Aerial Cable Facility Complex consists of several cables stretched across Sol Se Mete Canyon, located in the eastern portion of KAFB on a 22,500-ac (9,100-ha) area of the Cibola National Forest withdrawn from public domain for the exclusive use of KAFB and DOE. Test objects released from the maximum height of 600 ft (183 m) above the valley floor could achieve gravitationally accelerated velocities of up to 190 ft/s (58 m/s).

(Stibick, 2000; West, 1995)

<u>Current Operations and Capabilities</u>

Capabilities of the Aerial Cable Facility Complex include precision testing of full-scale, air-deliverable weapon systems, verification of design integrity and performance, and impact testing for container compliance (10 CFR 71). The complex supports SNL/NM Energy Programs for transportation package certification and design verification of transportation technology.

The aerial cable is used to test missile warning receivers, decoys, and jammers. Test hardware installed in trolleys traverses the cable in captive flight. Threat missiles, launched at various ranges from the cable, are tracked by laser while the warning receiver, decoy, or jammer responses are recorded relative to the missile's position.

(Stibick, 2000)

<u>Summary of Aerial Cable Facility Operations in FY2001</u>

During FY2001, the Aerial Cable Facility maintained the capability to include drop tests of joint test assemblies that contain depleted uranium (DU), enriched uranium, and insensitive high explosives (IHE). The total number of drop/pull-down tests involved five experiments in FY2001. In FY2001, no aerial target tests or scoring system tests were conducted. Section 4.7 shows FY2001 material inventories, material consumption, emissions, and process requirements were within parameters analyzed in the SWEIS expanded operations alternative.

(SNL, 2002i)

4.5.2 Containment Technology Test Facility-West (CTTF-West)

The CTTF-West, located in Coyote Test Field (CTF), includes one scale-model reactor containment building. The model is a 1:4 scale representation of a two-buttress, prestressed concrete containment structure with a flat concrete basemat, cylindrical sides, and hemispheric dome; model dimensions are 25 ft (7.6 m) in diameter by 43 ft (13.1 m) high. Previously, a 1:10 scale steel-containment structure fabricated in Japan and shipped to SNL was tested; model dimensions were ~10 ft (3 m) in diameter by 21 ft (6.4 m). This model has been destroyed, and, except for some samples, all fixtures associated with this test have been removed from the site.

(DOE, 1992; Emerson, 1992; Hessheimer, 2000)

Current Operations and Capabilities

Containment model testing at CTTF-West has been conducted for the U.S. Nuclear Regulatory Commission (NRC) and the Nuclear Power Engineering Corporation, Tokyo, Japan, to support reactor containment research and development (DOE, 1992; Emerson, 1992). Both containment models were constructed to be tested to failure by pneumatic overpressurization with nitrogen gas (SNL, 1997). All tests specified in the original test program have been completed. The final hydrostatic test of the prestressed concrete containment model was performed October 2001. Facility decommissioning and decontamination has been performed, including all support facilities which were temporary and portable. The site has been restored and returned to the U.S. Air Force (USAF) (SNL, 2002i).

Summary of CTTF-West Operations in FY2001

In FY2001, the CTTF-West conducted no experiments. Section 4.7 shows FY2001 material inventories, material consumption, emissions, and process requirements were well within parameters analyzed in the SWEIS expanded operations alternative, with one exception. Estimated expenditures remained at $3M in FY2001, over $1M more than estimated in the SWEIS. The additional money was used for decommissioning and demolition activities, in preparation of returning the land-use permit back to the USAF.

(SNL, 2002i)

4.5.3 Explosives Applications Laboratory

The Explosives Applications Laboratory is located within a complex at CTF, and consists of 2,634 ft^2 (245 m^2) with 1,167 ft^2 (108 m^2) of lab space. Four explosives storage bunkers are available at the laboratory.

(Kuzio, 2001)

Current Operations and Capabilities

The Explosives Applications Laboratory is used for the design, assembly, and testing of explosive experiments in support of SNL-wide programs. The Explosives Applications Laboratory supports the Nuclear Emergency Search Team (NEST), field test arming and firing (A&F), warhead development, development of emergency destruct systems, and the development of explosive components and systems. The laboratory is also used to maintain A&F systems' readiness for the Underground Test (UGT) Program. Work at the facility involves arming, fuzing, and firing of explosives and the testing of explosive systems components.

(Tachau, 2000; USAF, 2000)

Summary of Explosives Applications Laboratory Operations in FY2001

During FY2001, the Explosives Applications Laboratory completed 180 explosive tests. Section 4.7 shows FY2001 material inventories, material consumption, emissions, and process requirements were well within parameters analyzed in the SWEIS expanded operations alternative, with one exception. The Explosives Applications Laboratory contained 30 gal (114 l) of film developer in its hazardous material inventory. This amount represents an increase of 10 gal (38 liters) over the amount estimated in the SWEIS.

(SNL, 2001j)

4.5.4 Lurance Canyon Burn Site

Lurance Canyon Burn Site includes facilities within an area of ~220 ac (89 ha) in the Withdrawn Area. The terrain is foothills to mountainous, with an elevation of ~6,400 ft (1,951 m), and high-desert vegetation.

Several concrete pools are used at the site for conducting open burn tests. A 30-ft by 60-ft (9-m by 18-m) concrete pool is used for fire-testing large objects. This reinforced concrete pool, 36 in. (91 cm) deep, can support objects weighing up to 140 tons (127 metric tons) and accommodate objects as large as railroad cars. A 20-ft (6.1-m) square steel pool, used for fire-testing intermediate-sized objects, has a metal test stand in the center flanked by two instrumentation towers. Smaller pools have been built to meet specific test requirements. A 6-ft by 18-ft (1.8-m by 5.5-m) stainless-steel pool is used in tests where only one side of an object is exposed to fire. The facility also includes a 10-ft (3-m)-diameter pool and a 15-ft (4.6-m) square pool.

Two enclosed fire test facilities, the Small Wind Shield (SWISH) and the Fire Laboratory for the Authentication of Models and Experiments (FLAME), are also at the site. These facilities, unique in the United States, were designed to meet Albuquerque/Bernalillo County Air Quality Regulation (20 NMAC 11.05), "Visible Air Contaminants."

Lurance Canyon Burn Site has two double-walled, aboveground, enclosed 25,000-gal (94,625-l) tanks; one contains water for open pool tests, and the other contains a water/propylene glycol mixture that circulates within the walls of FLAME for cooling during tests. Additional water is stored in two underground, 5,000-gal (18,925-l) nonpotable water tanks. Jet fuel for open pool tests is stored in another aboveground, enclosed 30,000-gal (113,550-l) fuel tank located in an earthen containment berm.

(DOE, 1994b, 1995; Stibick, 2000)

Current Operations and Capabilities

The Lurance Canyon Burn Site is the SNL/NM test facility for fire-testing weapons, weapon components, and shipping containers in aviation fuel fires, propellant fires, and wood fires for verification of design integrity and performance.

Open pool fires are used to simulate transportation accidents, which may involve pooling of spilled motor oil or gasoline. Because of its volatility, gasoline is not used as a test fuel at the site. Aviation fuel produces the same test results, with less danger to site personnel; the majority of tests use JP-8 aviation fuel, a distillate produced by blending gasoline and kerosene stocks, with an average molecular weight of 125.

Some fire tests can include rocket propellant to evaluate the vulnerability of weapons and satellites to accident scenarios, such as a missile fire on a launch pad. Propellants are ignited on a steel plate on the ground, and test objects are supported above the propellants. Rocket propellant fires last up to 10 minutes, with up to 3,000 lb (1,364 kg) of propellant consumed, depending upon the test object size.

Fuel-air mixture tests are conducted to qualify electronic equipment according to National Electrical Code standards. Electronic equipment is operated in an explosive atmosphere to evaluate whether the equipment will cause a spark that could ignite fuel vapors. Wood fire or crib tests are conducted to meet U.S Department of Transportation (DOT) requirements for explosive component shipping containers.

(DOE, 1994b, 1995; SNL, 2002i; Stibick, 2000; Tieszen, 1996)

Summary of Lurance Canyon Burn Site Operations in FY2001

During FY2001, 8 certification tests were conducted at the Lurance Canyon Burn Site. Model validation tests and user tests involved 45 and 20 tests in FY2001, respectively. Section 4.7 shows FY2001 material inventories, material consumption, emissions, and process requirements were well within parameters analyzed in the SWEIS expanded operations alternative. It should be noted that the Lurance Canyon Burnsite increased the number of JP-8 burns from 15 in FY2000 to 65 in FY2001. This increase in JP-8 burns exceeded the SWEIS expanded operations alternative by 15 burns, yet the overall amount of JP-8 burned remained within the projections in the SWEIS expanded operations alternative.

(SNL, 2002i)

4.5.5 Thunder Range Complex

The Thunder Range Complex was used from 1969 through 1993 to support development, safety, reliability, and certification tests of Atomic Energy Commission (AEC)/DOE weapon systems.

Located southeast of TA-III in CTF, the Thunder Range Complex is generally bounded on the north by Magazine Road, although a triangular area north of this road (North Thunder Range) is also part of the permitted parcel. The complex is bounded on the southeast by a fence along Isleta Road. The portion of the Thunder Range Complex closest to the Isleta Pueblo is about half a mile north of that boundary (see SNL [1999b], Figures 2-1, 2-6, 2-13, and 2-16). The site is flat, open terrain covered with shrub grassland.

Only three structures are currently being used by SNL/NM. These are located on the northeastern side of the Thunder Range Complex, south of Magazine Road.

Located southwest of the Thunder Range Complex is the Conventional High Explosives & Simulation Test (CHEST) Site, which is also shown on maps as Chestnut Site or Range. The Chestnut Range is used for explosives tests. Although SNL/NM explosives testing activities have ceased at the Thunder Range Complex, Chestnut Range continues to be used as an active explosives testing site by the USAF and its contractors. (See SNL [1999b], Figure 2-6. The Air Force Research Laboratory was formerly known as Phillips Laboratory, and before that as the Air Force Weapons Laboratory.)

<u>Current Operations and Capabilities</u>

Previously, SNL has used portions of Thunder Range Complex for ground-truthing activities, such as radar return collection studies. This involves the use of "targets" such as vehicles or passive calibration sources (corner reflectors) placed on the ground surface. SNL/NM personnel have used optical instruments in the past to observe explosive tests done by the USAF at the Chestnut Range. Project plans call for continued observation of some future tests on a nonparticipatory basis. The amount and scope of these observations will be determined by funding. Observation locations could be on the Thunder Range Complex, but normally take place from a higher elevation, such as the hill northeast of the Complex.

(DOE, 1997b; Dunbar, 1998; Kerschen, 2000; SNL, 1995-1997, 2002i, Garcia-Sanchez, 1998)

<u>Summary of Thunder Range Complex Operations in FY2001</u>

During FY2001, no SNL-related outdoor explosive or shock-tube testing occurred at the Thunder Range Complex. Continuing activities on the site are primarily associated with disassembly, inspection, and documentation of special items, such as special nonnuclear munitions. No new construction is anticipated.

Test capabilities at the Thunder Range Complex include disassembly and evaluation, and calibration and verification of special nuclear and nonnuclear systems. Capabilities also involve cleaning, physical examination, measurement, sampling, photography, and data collection. Operations at the Thunder Range Complex involved one test in FY2001. Five equipment disassembly operations were completed in FY2001. Section 4.7 shows FY2001 material inventories, material consumption, emissions, and process requirements remained unchanged from the SWEIS expanded operations alternative.

(SNL, 2002i)

4.6 Infrastructure Facilities

4.6.1 Hazardous Waste Management Facility (HWMF)

The HWMF, south of TA-I, is a low-hazard facility that consists of two permanent buildings, the Waste Packaging Building and the Waste Storage Building, which are located within a single 8-ft-high (2.4-m) fenced enclosure. The two storage facilities are ~3,500 ft^2 (325 m^2) and 1,800 ft^2 (167 m^2), respectively. The facility includes six supply sheds, a covered and bermed waste storage area, a catchment pond, offices, and two self-contained storage structures.

(Kuzio, 2001; SNL, 1992)

Current Operations and Capabilities

The HWMF is responsible for the safe handling, packaging, short-term storage, and shipment (for recycling, treatment, or disposal) of all nonradioactive waste regulated by the *Resource Conservation and Recovery Act* (RCRA), except explosive waste and other hazardous and toxic waste (SNL, 1992).

Nonradioactive, hazardous chemical waste that is generated at SNL/NM and its associated satellite facilities (e.g., the Advanced Materials Laboratory located at the University of New Mexico, Albuquerque) is collected and transported to the HWMF for packing and short-term storage prior to offsite transportation for recycling, treatment, or disposal at a licensed facility. The waste is typically not stored for more than 365 days. No radioactive material or explosive material is managed at the HWMF.

(SNL, 2002i)

Summary of Hazardous Waste Management Facility Operations in FY2001

During FY2001, the HWMF also continued to prepare waste for offsite transportation for recycling, treatment, or disposal at licensed facilities. Operations at the HWMF remained at one shift. Quantities of RCRA hazardous waste managed were 146,735 lb (66,559 kg) in FY2001 (well within the permitted capacity). Section 4.7 shows FY2001 material inventories, material consumption, emissions, and process requirements were within the SWEIS expanded operations alternative analyses. The HWMF exceeded the SWEIS expanded operations projections in the area of hazardous waste; however, this was in hazardous waste processing, and not waste generation. In FY2001, the HWMF processed ~2,304 lb (1,045 kg) of hazardous waste due it is believed in large part to increased waste generated from Environmental Restoration activities.

(SNL, 2002i)

4.6.2 Radioactive and Mixed Waste Management Facility (RMWMF)

The RMWMF compound is located in the fenced southeastern portion of TA-III. The main building consists of 8,507 ft^2 (790 m^2) and provides most of the waste-handling capacity at the facility. The RMWMF compound includes: a storage building for reactive waste; a storage building for flammable waste; a building for compressed gas cylinder storage; both paved and unpaved outdoor, low-level waste and mixed waste storage areas; and a synthetic-lined retention pond to hold site surface-water runoff. The RMWMF is designed as a centralized area for receipt, characterization, treatment, repackaging, storage, and shipment of mixed and low-level radioactive waste and hazardous waste regulated by RCRA.

The maximum storage capacity at the RMWMF compound is ~285,000 ft^3 (8,071 m^3). In addition to the storage at the RMWMF compound, nine other storage areas are used, including the High Bay Waste Storage Facility, and seven of the Manzano storage bunkers. On average, the earth-covered bunkers each provide 2,000 ft^2 (186 m^2) of storage space. The retention pond is located west of the RMWMF compound. The pond also collects water from fire-control activities and storm-water runoff.

(Kuzio, 2001; Massey, 1991; SNL, 1996b)

Current Operations and Capabilities

SNL/NM operates the RMWMF for receipt, characterization, compaction, treatment (if necessary), repackaging, certification, and storage of low-level waste (LLW), transuranic (TRU) waste, and mixed waste. The RMWMF treats and stores waste until disposal or treatment sites are identified that can accept the waste. The volume of waste varies, depending on the storage time before the waste is shipped for disposal. This facility enables SNL/NM to handle and store the waste in compliance with applicable requirements of federal, state, and local environmental regulations, DOE directives, and offsite waste acceptance criteria. In addition, the facility, which opened in 1996, allows SNL/NM to prepare the waste for shipment, treatment, and disposal in accordance with specific requirements regarding waste certification, packaging, and transport.

(Jassy, 2000; Peters, 1996; SNL, 2002i)

Summary of RMWMF Operations in FY2001

During FY2001, the RMWMF continued to prepare waste for offsite treatment and disposal at licensed facilities. Operations at the RMWMF remained at one shift. FY2001 quantities of radioactive waste managed (including newly generated and legacy waste) were ~10,202 ft^3 (289 m^3) for LLW.

In FY2001, for low-level mixed waste (LLMW), TRU waste, and mixed transuranic (MTRU) waste, the quantities generated and managed are approximately as follows: 364 ft^3 (10 m^3) LLMW, 0 ft^3 (0 m^3) TRU, and 1 ft^3 (0.03 m^3) MTRU waste. The infrastructure-processing rate was 1.9 M lb (861,800 kg) per year, which is well within the SWEIS expanded operations alternative analysis. Section 4.7 shows FY2001 material inventories, material consumption, emissions, and process requirements were approximately equal to the levels of the SWEIS expanded operations alternative analysis.

(SNL, 2002i)

4.6.3 Steam Plant

The Steam Plant provides 18,307 ft^2 (1,700 m^2) of area for five operational boilers with supporting systems that supply steam to SNL/NM TA-I and KAFB buildings from Eubank to Pennsylvania, and from Hardin Avenue to the Wyoming Boulevard base gate. The steam is used primarily for heating purposes, freeze protection, domestic hot water, and humidification. For most TA-I buildings, steam is the only heating source; thus, during the winter, the plant operation is critical to the missions of these facilities.

(Kuzio, 2001; SNL, 1994a)

Current Operations and Capabilities

In addition to providing the steam supply system to all of SNL/NM TA-I and eastern KAFB, the Steam Plant has several other functions. Steam is also essential to other programmatic missions, such as those at the Standards Lab and the Microelectronics Development Laboratory (MDL). During nonstandard hours at SNL/NM, the Steam Plant provides monitoring for building-critical alarms to all major buildings, and services (such as Telecon) for emergency maintenance problems at all SNL/NM (and SNL/CA) facilities and utility distribution systems.

(Chavez, 2000)

The plant currently has three 10,000-gal (37,850-l) tanks for diesel fuel (located on the building's east end) and one 500-gal (1,893-l) diesel tank (on the northwest corner) that are used for the emergency generator. Two 300-gal (1,136-l) propane tanks, located on the plant's north side, are used for emergency lighting of the boilers during natural gas interruptions. Three of the five boilers, specifically the 50,000-lb (22,680-kg)-per-hour boilers, have reached or exceeded their design life.

(SNL, 1994a, 2002i)

Summary of Steam Plant Operations in FY2001

The Steam Plant continued to produce and distribute steam to SNL/NM and KAFB facilities. Steam production was ~529 million pounds (M lb) (240M kg) in FY2001, which is well below the SWEIS expanded operations alternative. The Steam Plant added flue gas recirculation, which is expected to reduce nitrogen oxide emissions, to Boiler #1 and #2. Overall boiler efficiency has improved; future upgrades may include a technology change for continued improvements in boiler efficiency. Section 4.7 shows FY2001 material inventories, material consumption, emissions, and process requirements were within parameters analyzed in the SWEIS expanded operations alternative. However, there was a slight increase in boiler energy, which exceeded the SWEIS expanded operations alternative.

(SNL, 2002i; Wrons, 2002)

4.6.4 Thermal Treatment Facility (TTF)

The TTF, located in the northeast corner of TA-III, consists of a square burn pan of 0.375-in. (1-cm) steel, 29.25 in. (75 cm) on each side and 5.12 in. (13 cm) deep. A remotely operated metal lid can be raised or lowered to cover the burn pan. The burn pan is enclosed by a grated metal cage that is open to the air and is ~4 ft (1.2 m) on each side, and 8 ft (2.4 m) tall.

The cage is centered on a steel-lined concrete pad ~13 ft (4 m) on each side, with a 4-in. (10-cm)-high curb at the perimeter. The concrete pad is surrounded on the west, south, and east sides by an 8-ft (2.4-m)-tall earthen berm. An 8-ft (2.4-m)-high chainlink security fence surrounds the entire TTF.

(SNL, 1994b)

Current Operations and Capabilities

The TTF was originally built to support the Light-Initiated High Explosive (LIHE) Facility to provide onsite treatment for the facility's explosive-contaminated waste stream that did not comply with transportation requirements. The LIHE Facility was mothballed in 1992, with the possibility of eventual restart.

Currently, the TTF thermally treats (burns) small quantities of waste explosive substances, waste liquids (e.g., water and solvents) contaminated with explosive substances, and waste items (e.g., rags, wipes, and swabs) contaminated with explosive substances. No radioactive waste is treated at the TTF.

(SNL, 1994b; 2002i)

Although ash from a treatment event is not usually hazardous waste (although waste from the LIHE Facility may contain silver), it is collected and managed as hazardous waste and sent to the HWMF for disposal at an approved offsite landfill.

(SNL, 1994b, 2002i)

Summary of Thermal Treatment Facility Operations in FY2001

During FY2001, there was no waste treated at the TTF. Section 4.7 shows FY2001 material inventories, material consumption, emissions, and process requirements were all less than the SWEIS expanded operations alternative analysis.

The TTF continued a declining trend in FY2001 that began prior to FY1996. However, the TTF is necessary to the existence of the Light Initiated High Explosive (LIHE) facility. The LIHE process generates light-sensitive high explosive waste forbidden from transportation which, therefore, must be treated on-site. In 1992, the LIHE was mothballed, but the TTF was maintained to provide the capability of restarting LIHE and, to a lesser degree, treatment of certain SNL waste streams. The decision to restart LIHE was recently reached, and funding for the renovation of the building that the LIHE supports will be available soon. Generation of LIHE waste may commence as soon as FY2004 as a result of practice sprays and formulation checkout. An estimate of the FY2004 volume is currently unknown; however, any processed waste would not exceed 7,300 lb/year. The SWEIS expanded operations alternative places a maximum amount of waste processed at the TTF at 1,200 lb/yr.

(SNL, 2002i)

4.7 Summary of Selected Facility Operations in FY2001

Table 4-1 summarizes operational data from the selected facilities for FY2000, FY2001, and the SWEIS expanded operations alternative. The selected facilities are listed in the order that they appear in the preceding text of Chapter 4. The following guide is provided for ease in locating specific facility operational data.

Guide to Table 4-1 Entries

Table 4-1. Summary of Operational Data from Selected Facilities

Category	Description	Activity Type or Material	Units (per Year)	SWEIS Expanded Alternative	Data Reported for FY2000	FY2001
Advanced Manufacturing Processes Lab (AMPL) (TA-I) FY2001 Update (Section 4.1.1)						
Major Facility Activities	Development or Production of Devices, Processes, and Systems	Materials, Ceramics/Glass Electronics, Processes, and Systems	Operational Hours	347,000	248,000	312,000
Material Inventories	Nuclear Material Inventory	NA	Ci	0	0	0
	Radioactive Material Inventory	NA	Ci	0	0	0
	Spent Fuel Inventory	NA	kg	0	0	0
	Explosives Inventory	NA	kg	0	0	0
	Other Hazardous Material Inventory	NA	kg	0	0	0
Material Consumption	Nuclear Material Consumption	NA	g	0	0	0
	Radioactive Material Consumption	NA	Ci	0	0	0
	Explosives Consumption	NA	kg	0	0	0
Waste Generation	Low-Level Waste	NA	ft^3	0	0	0
	Transuranic Waste	NA	kg	0	0	0
	Mixed Waste	LLMW	kg	0	0	0
		Mixed TRU	ft^3	0	0	0
	Hazardous Waste	NA	kg	12,980	7,136	12,635
Emissions	Radioactive Air Emissions	Tritium	Ci	0	0	0
	Open Burning	NA	gal/burn	0	0	0
Process Support	Wastewater Effluent	NA	M gal	0	0	0
	Water Consumption	NA	M gal	0	0	0
	Electricity Consumption	NA	kWh	0	0	0
	Boiler Energy	NA	M ft^3	0	0	0
	Facility Personnel	NA	FTEs	204	150	175
	Expenditures	NA	M dollars	45	28	26
Explosive Components Facility (ECF, near TA-II) FY2001 Update (Section 4.1.2)						
Major Facility Activities	Test Activities	Neutron Generator Tests	Tests	NAPD[a]	NAPD	NAPD
		Explosive Testing	Tests	900	600	600
		Chemical Analysis	Analyses	1,250	900	900
		Battery Tests	Tests	100	50	55

Table 4-1. Summary of Operational Data from Selected Facilities (Continued)

Category	Description	Activity Type or Material	Units (per Year)	SWEIS Expanded Alternative	Data Reported for FY2000	FY2001
Explosive Components Facility (ECF, near TA-II) FY2001 Update (Section 4.1.2) (Cont'd.)						
Material Inventories[b]	Nuclear Material Inventory	Tritium	Ci	49	49	49
	Radioactive Material Inventory	NA	Ci	0	0	0
	Spent Fuel Inventory	NA	kg	0	0	0
	Explosives Inventory	Bare UNO 1.1	kg	NAPD	NAPD	NAPD
		Bare UNO 1.2	kg	NAPD	NAPD	NAPD
		Bare UNO 1.3	kg	NAPD	NAPD	NAPD
		Bare UNO 1.4	kg	NAPD	NAPD	NAPD
	Other Hazardous Material Inventory	NA	kg	0	0	0
Material Consumption	Nuclear Material Consumption	NA	g	0	0	0
	Radioactive Material Consumption	NA	Ci	0	0	0
	Explosives Consumption	Bare UNO 1.1	kg	NAPD	NAPD	NAPD
		Bare UNO 1.2	kg	NAPD	NAPD	NAPD
		Bare UNO 1.3	kg	NAPD	NAPD	NAPD
		Bare UNO 1.4	kg	NAPD	NAPD	NAPD
Waste Generation	Low-Level Waste	NA	ft^3	190	110	110
	Transuranic Waste	NA	ft^3	0	0	0
	Mixed Waste	LLMW	kg	1,000	1,000	1,000
		Mixed TRU	ft^3	0	0	0
	Hazardous Waste	NA	kg	500	400	400
Emissions	Radioactive Air Emissions	Tritium	Ci	$2x10^{-3}$	$1x10^{-3}$	$1x10^{-3}$
	Open Burning	NA	gal/burn	0	0	0
Process Support	Wastewater Effluent	NA	M gal	6.4	5.4	5.4
	Water Consumption	NA	M gal	7.0	6.0	6.1
	Electricity Consumption	NA	kWh	3,400,000	2,900,000	2,900,000
	Boiler Energy	NA	M ft^3	29	24	24
	Facility Personnel	NA	FTEs	102	86	88
	Expenditures	NA	M Dollars	2.5	1.9	2.1
Major Facility Activities	Other	Research and Development of Materials	Operational Hours	395,454	395,454	Not Reported

Table 4-1. Summary of Operational Data from Selected Facilities (Continued)

Category	Description	Activity Type or Material	Units (per Year)	SWEIS Expanded Alternative	Data Reported for FY2000	FY2001
Integrated Materials Research Laboratory (IMRL) (TA-I) FY2001 Update (Section 4.1.3)						
Material Inventories	Nuclear Material Inventory	Depleted Uranium	µCi	1.0[c]	0	0
	Radioactive Material Inventory	NA	Ci	0	0	0
	Spent Fuel Inventory	NA	kg	0	0	0
	Explosives Inventory	NA	kg	0	0	0
	Other Hazardous Material Inventory	NA	kg	0	0	0
Material Consumption	Nuclear Material Consumption	NA	g	0	0	0
	Radioactive Material Consumption	NA	Ci	0	0	0
	Explosives Consumption	NA	kg	0	0	0
Waste Generation	Low-Level Waste	NA	ft^3	0	0	0
	Transuranic Waste	NA	ft^3	0	0	0
	Mixed Waste	LLMW	kg	0	0	0
		Mixed TRU	ft^3	0	0	0
	Hazardous Waste	NA	kg	2,000	3,347	2,372
Emissions	Radioactive Air Emissions	NA	Ci	0	0	0
	Open Burning	NA	gal/burn	0	0	0
Process Support	Wastewater Effluent	NA	M gal	0	0	0
	Water Consumption	NA	M gal	0	0	0
	Electricity Consumption	NA	kWh	0	0	0
	Boiler Energy	NA	ft^3	0	0	0
	Facility Personnel	NA	FTEs	250	250	220
	Expenditures	NA	M Dollars	62	55	45
Microelectronics Development Laboratory (TA-I) FY2001 Update (Section 4.1.4)						
Major Facility Activities	Development or Production of Devices, Processes, and Systems	Microelectronic Devices and Systems	Wafers	7,500	4,000	5,000
Material Inventories	Nuclear Material Inventory	NA	Ci	0	0	0
	Radioactive Material Inventory	NA	Ci	0	0	0
	Spent Fuel Inventory	NA	kg	0	0	0
	Explosives Inventory	NA	kg	0	0	0
	Other Hazardous Material Inventory	NA	kg	0	0	0

Table 4-1. Summary of Operational Data from Selected Facilities (Continued)

Category	Description	Activity Type or Material	Units (per Year)	SWEIS Expanded Alternative	Data Reported for FY2000	FY2001
Microelectronics Development Laboratory (TA-I) FY2001 Update (Section 4.1.4) (Cont'd.)						
Material Consumption	Nuclear Material Consumption	NA	Ci	0	0	0
	Radioactive Material Consumption	NA	Ci	0	0	0
	Explosives Consumption	NA	kg	0	0	0
Waste Generation	Low-Level Waste	NA	kg	0	0	0
	Transuranic Waste	NA	kg	0	0	0
	Mixed Waste	LLMW	kg	0	0	0
		Mixed TRU	kg	0	0	0
	Hazardous Waste	NA	kg	12,135	3,484	4,816
Emissions	Radioactive Air Emissions	NA	Ci	0	0	0
	Open Burning	NA	gal/burn	0	0	0
Process Support	Wastewater Effluent	NA	M gal	79.0	79.8	46.7
	Water Consumption	NA	M gal	99	77.9	91
	Electricity Consumption	NA	kWh	35,000,000	28,640,059	26,534,000
	Boiler Energy	NA	ft^3	40,500,000	34,346,000	26,136,000
	Facility Personnel	NA	FTEs	294	133	140
	Expenditures	NA	M Dollars	73	35	37
Neutron Generator Facility (NGF) (TA-I) FY2001 Update (Section 4.1.5)						
Major Facility Activities	Development or Production of Devices, Processes, and Systems	Neutron Generators	Neutron Generators	NAPD	NAPD	NAPD
Material Inventories	Nuclear Material Inventory	Tritium	Ci	836	1,040	800
	Radioactive Material Inventory	NA	Ci	0	0	0
	Spent Fuel Inventory	NA	kg	0	0	0
	Explosives Inventory	NA	kg	0	0	0
	Other Hazardous Material Inventory	NA	kg	0	0	0
Material Consumption	Nuclear Material Consumption	Tritium	Ci	836	282	204
	Radioactive Material Consumption	NA	Ci	0	0	0
	Explosives Consumption	NA	kg	0	0	0

Table 4-1. Summary of Operational Data from Selected Facilities (Continued)

Category	Description	Activity Type or Material	Units (per Year)	SWEIS Expanded Alternative	Data Reported for FY2000	FY2001
Neutron Generator Facility (NGF) (TA-I) FY2001 Update (Section 4.1.5) (Cont'd.)						
Waste Generation	Low-Level Waste	NA	kg	4,000	2,500	780
	Transuranic Waste	NA	kg	0	0	0
	Mixed Waste	LLMW	kg	300	100	31
		Mixed TRU	kg	0	0	0
	Hazardous Waste	NA	kg	3,680	3,000	2,800
Emissions	Radioactive Air Emissions	Tritium	Ci	156	41	27
	Open Burning	NA	gal/burn	0	0	0
Process Support	Wastewater Effluent	NA	M gal	5	3	2.9
	Water Consumption	NA	M gal	5	3	2.9
	Electricity Consumption	NA	kWh	0	0	0
	Boiler Energy	NA	ft^3	0	0	0
	Facility Personnel	NA	FTEs	280	262	273
	Expenditures	NA	M Dollars	55	25	33
Centrifuge Complex (TA-III) FY2001 Update (Section 4.2.1)						
Major Facility Activities	Test Activities	Centrifuge	Tests	120	21	21
		Impact	Tests	100	0	0
Material Inventories	Nuclear Inventory	NA	kg	0	0	0
	Radioactive Material Inventory	NA	Ci	0	0	0
	Spent Fuel Inventory	NA	kg	0	0	0
	Explosives Inventory	NA	g	0	0	0
	Other Hazardous Material Inventory	NA	kg	0	0	0
Material Consumption	Nuclear Material Consumption	NA	Ci	0	0	0
	Radioactive Material Consumption	NA	Ci	0	0	0
	Explosives Consumption	Bare UNO 1.1	kg	7	0	0
		Bare UNO 1.3	kg	2,272	0	0
		Bare UNO 1.4	g	890	0	0
Waste Generation	Low-Level Waste	NA	ft^3	0	0	0
	Transuranic Waste	NA	ft^3	0	0	0
	Mixed Waste	LLMW	ft^3	0	0	0
		Mixed TRU	ft^3	0	0	0
	Hazardous Waste	NA	kg	15	3	3

Table 4-1. Summary of Operational Data from Selected Facilities (Continued)

Category	Description	Activity Type or Material	Units (per Year)	SWEIS Expanded Alternative	Data Reported for FY2000	FY2001
Centrifuge Complex (TA-III) FY2001 Update (Section 4.2.1) (Cont'd.)						
Emissions	Radioactive Air Emissions	NA	Ci	0	0	0
	Open Burning	NA	gal/burn	0	0	0
Process Support	Wastewater Effluent	NA	M gal	0	0	0
	Water Consumption	NA	M gal	0	0	0
	Electricity Consumption	NA	kWh	0	0	0
	Boiler Energy	NA	ft^3	0	0	0
	Facility Personnel	NA	FTEs	10	2	2
	Expenditures	NA	M Dollars	0.75	0.2	0.2
Drop/Impact Complex (TA-III) FY2001 Update (Section 4.2.2)						
Major Facility Activities	Test Activities	Drop Test	Tests	50	2	3
		Water Impact	Tests	20	0	0
		Submersion	Tests	5	0	0
		Underwater Blast	Tests	10	0	0
Material Inventories	Nuclear Inventory	NA	kg	0	0	0
	Radioactive Material Inventory	NA	Ci	0	0	0
	Spent Fuel Inventory	NA	kg	0	0	0
	Explosives Inventory	NA	g	0	0	0
	Other Hazardous Material Inventory	NA	kg	0	0	0
Material Consumption	Nuclear Material Consumption	NA	Ci	0	0	0
	Radioactive Material Consumption	NA	Ci	0	0	0
	Explosives Consumption	Bare UNO 1.1	kg	6.8	0	0
		Bare UNO 1.3	kg	1,100	6	6
		Bare UNO 1.4	g	1,157	17	19
Waste Generation	Low-Level Waste	NA	ft^3	0	0	0
	Transuranic Waste	NA	ft^3	0	0	0
	Mixed Waste	LLMW	ft^3	0	0	0
		Mixed TRU	ft^3	0	0	0
	Hazardous Waste	NA	kg	Minimal	Minimal	Minimal
Emissions	Radioactive Air Emissions	NA	Ci	0	0	0
	Open Burning	NA	gal/burn	0	0	0

Table 4-1. Summary of Operational Data from Selected Facilities (Continued)

Category	Description	Activity Type or Material	Units (per Year)	SWEIS Expanded Alternative	Data Reported for FY2000	FY2001
Drop/Impact Complex (TA-III) FY2001 Update (Section 4.2.2) (Cont'd.)						
Process Support	Wastewater Effluent	NA	M gal	0	0	0
	Water Consumption	NA	M gal	0	0	0
	Electricity Consumption	NA	kWh	0	0	0
	Boiler Energy	NA	ft^3	0	0	0
	Facility Personnel	NA	FTEs	8	1.5	2
	Expenditures	NA	Dollars	146,000	50,000	52,000
Sled Track Complex (TA-III) FY2001 Update (Section 4.2.3)						
Major Facility Activities	Test Activities	Rocket Sled Test	Tests	80	12	12
		Explosive Testing	Tests	239	10	10
		Rocket Launcher	Tests	24	3	3
		Free-Flight Launch	Tests	150	22	22
Material Inventories	Nuclear Inventory	NA	kg	0	0	0
	Radioactive Material Inventory	NA	Ci	0	0	0
	Spent Fuel Inventory	NA	kg	0	0	0
	Explosives Inventory	NA	g	0	0	0
	Other Hazardous Material Inventory	NA	kg	0	0	0
Material Consumption	Nuclear Material Consumption	NA	Ci	0	0	0
	Radioactive Material Consumption	NA	Ci	0	0	0
	Explosives Consumption	Bare UNO 1.1	kg	2,761	0	0
		Bare UNO 1.3	kg	36,170	3,116	3,116
		Bare UNO 1.4	g	214	27	27
Waste Generation	Low-Level Waste	NA	ft^3	0	0	0
	Transuranic Waste	NA	ft^3	0	0	0
	Mixed Waste	LLMW	ft^3	0	0	0
		Mixed TRU	ft^3	0	0	0
	Hazardous Waste	NA	kg	50	12	12
Emissions	Radioactive Air Emissions	NA	Ci	0	0	0
	Open Burning	Explosives	kg	1,670	0	0

Table 4-1. Summary of Operational Data from Selected Facilities (Continued)

Category	Description	Activity Type or Material	Units (per Year)	SWEIS Expanded Alternative	Data Reported for FY2000	FY2001
Sled Track Complex (TA-III) FY2001 Update (Section 4.2.3) (Cont'd.)						
Process Support	Wastewater Effluent	NA	M gal	0	0	0
	Water Consumption	NA	M gal	0	0	0
	Electricity Consumption	NA	kWh	0	3.3	3.3
	Boiler Energy	NA	ft^3	0	0.4	0.4
	Facility Personnel	NA	FTEs	40	9	10
	Expenditures	NA	M Dollars	1.95	.367	.400
Terminal Ballistics Facility (TA-III) FY2001 Update (Section 4.2.4)						
Major Facility Activities	Test Activities	Projectile Impact Testing	Tests	350	50	50
		Propellant Testing	Tests	100	25	25
Material Inventories	Nuclear Inventory	NA	kg	0	0	0
	Radioactive Material Inventory	NA	Ci	0	0	0
	Spent Fuel Inventory	NA	kg	0	0	0
	Explosives Inventory	Bare UNO 1.1	kg	NAPD	NAPD	NAPD
		Bare UNO 1.2	kg	NAPD	NAPD	NAPD
		Bare UNO 1.3	g	NAPD	NAPD	NAPD
		Bare UNO 1.4	g	NAPD	NAPD	NAPD
	Other Hazardous Material Inventory	NA	kg	0	0	0
Material Consumption	Nuclear Material Consumption	NA	Ci	0	0	0
	Radioactive Material Consumption	NA	Ci	0	0	0
	Explosives Consumption	Bare UNO 1.1	kg	NAPD	NAPD	NAPD
		Bare UNO 1.2	kg	NAPD	NAPD	NAPD
		Bare UNO 1.3	kg	NAPD	NAPD	NAPD
		Bare UNO 1.4	kg	NAPD	NAPD	NAPD
Waste Generation	Low-Level Waste	NA	ft^3	0	0	0
	Transuranic Waste	NA	ft^3	0	0	0
	Mixed Waste	LLMW	ft^3	0	0	0
		Mixed TRU	ft^3	0	0	0
	Hazardous Waste	NA	kg	0.75	0.25	0.2
Emissions	Radioactive Air Emissions	NA	Ci	0	0	0
	Open Burning	NA	gal/burn	0	0	0

Table 4-1. Summary of Operational Data from Selected Facilities (Continued)

Category	Description	Activity Type or Material	Units (per Year)	SWEIS Expanded Alternative	Data Reported for FY2000	FY2001
Terminal Ballistics Facility (TA-III) FY2001 Update (Section 4.2.4) (Cont'd.)						
Process Support	Wastewater Effluent	NA	M gal	0	0	0
	Water Consumption	NA	M gal	0	0	0
	Electricity Consumption	NA	kWh	0	0	0
	Boiler Energy	NA	ft^3	0	0	0
	Facility Personnel	NA	FTEs	2	0.3	2
	Expenditures	NA	dollars	12,000	8,500	14,000
APPRM (TA-IV) FY2001 Update (Section 4.3.1)						
Major Facility Activities	Test Activities	Accelerator Shots	Shots	2,000	234	300
Material Inventories	Nuclear Inventory	NA	µg	0	0	0
	Radioactive Material Inventory	NA	Ci	0	0	0
	Spent Fuel Inventory	NA	kg	0	0	0
	Explosives Inventory	NA	g	0	0	0
	Other Hazardous Material Inventory	Insulator Oil	gal	130,000	134,700	164,000
Material Consumption	Nuclear Material Consumption	NA	µg	0	0	0
	Radioactive Material Consumption	NA	Ci	0	0	0
	Explosives Consumption	NA	g	0	0	0
Waste Generation	Low-Level Waste	NA	ft^3	0	0	0
	Transuranic Waste	NA	ft^3	0	0	0
	Mixed Waste	LLMW	ft^3	0	0	0
		Mixed TRU	ft^3	0	0	0
	Hazardous Waste	NA	kg	200	110	100
Emissions	Radioactive Air Emissions	NA	Ci	0	0	0
	Open Burning	NA	gal/burn	0	0	0
Process Support	Wastewater Effluent	NA	M gal	0	0	0
	Water Consumption	NA	M gal	0	0	0
	Electricity Consumption	NA	kWh	0	0	0
	Boiler Energy	NA	ft^3	0	0	0
	Facility Personnel	NA	FTEs	7	5	9.5
	Expenditures	NA	M Dollars	5	1.4	2

Table 4-1. Summary of Operational Data from Selected Facilities (Continued)

Category	Description	Activity Type or Material	Units (per Year)	SWEIS Expanded Alternative	Data Reported for FY2000	FY2001
HERMES III (TA-IV) FY2001 Update (Section 4.3.2)						
Major Facility Activities	Test Activities	Irradiation of Components or Materials	Shots	1,450	183	288
Material Inventories	Nuclear Inventory	NA	Ci	0	0	0
	Radioactive Material Inventory	NA	Ci	0	0	0
	Spent Fuel Inventory	NA	kg	0	0	0
	Explosives Inventory	NA	g	0	0	0
	Other Hazardous Material Inventory	Insulator Oil	gal	160,000	160,000	160,000
Material Consumption	Nuclear Material Consumption	NA	Ci	0	0	0
	Radioactive Material Consumption	NA	Ci	0	0	0
	Explosives Consumption	NA	g	0	0	0
Waste Generation	Low-Level Waste	NA	ft^3	1.38	0.25	0.25
	Transuranic Waste	NA	ft^3	0	0	0
	Mixed Waste	LLMW	ft^3	0	0	0
		Mixed TRU	ft^3	0	0	0
	Hazardous Waste	NA	kg	915	893	549
Emissions	Radioactive Air Emissions	Nitrogen-3	Ci	$36.03x10^{-4}$	$6.4x10^{-4}$	$3.4x10^{-4}$
		Oxygen-15	Ci	$36.03x10^{-5}$	$6.4x10^{-5}$	$3.4x10^{-5}$
	Open Burning	NA	kg	0	0	0
Process Support	Wastewater Effluent	NA	M gal	0	0	0
	Water Consumption	NA	M gal	0	0	0
	Electricity Consumption	NA	kWh	0	0	0
	Boiler Energy	NA	ft^3	0	0	0
	Facility Personnel	NA	FTEs	15	4	4
	Expenditures	NA	M Dollars	4.4	1.12	1.2

Table 4-1. Summary of Operational Data from Selected Facilities (Continued)

Category	Description	Activity Type or Material	Units (per Year)	SWEIS Expanded Alternative	Data Reported for FY2000	FY2001
RITS (TA-IV) FY2001 Update (Section 4.3.3)						
Major Facility Activities	Test Activities	Accelerator Shots	Shots	800	0	0
Material Inventories	Nuclear Inventory	NA	µg	0	0	0
	Radioactive Material Inventory	Hardware	kg	~500	0	0
	Spent Fuel Inventory	NA	kg	0	0	0
	Explosives Inventory	Bare UNO 1.1	kg	300	0	0
	Other Hazardous Material Inventory	Insulator Oil	gal	40,000	0	0
Material Consumption	Nuclear Material Consumption	NA	µg	0	0	0
	Radioactive Material Consumption	NA	Ci	0	0	0
	Explosives Consumption	NA	kg	300	0	0
Waste Generation	Low-Level Waste	NA	ft^3	120	0	0
	Transuranic Waste	NA	ft^3	0	0	0
	Mixed Waste	LLMW	ft^3	0	0	0
		Mixed TRU	ft^3	0	0	0
	Hazardous Waste	NA	kg	272	0	0
Emissions	Radioactive Air Emissions	Nitrogen-13	Ci	0.16	0	0
	Open Burning	NA	gal/burn	0	0	0
Process Support	Wastewater Effluent	NA	M gal	0	0	0
	Water Consumption	NA	M gal	0	0	0
	Electricity Consumption	NA	kWh	0	0	0
	Boiler Energy	NA	ft^3	0	0	0
	Facility Personnel	NA	FTEs	6	0	0
	Expenditures	NA	M Dollars	4	0	0

Table 4-1. Summary of Operational Data from Selected Facilities (Continued)

Category	Description	Activity Type or Material	Units (per Year)	SWEIS Expanded Alternative	Data Reported for FY2000	FY2001
RHEPP I (TA-IV) FY2001 Update (Section 4.3.4)						
Major Facility Activities	Test Activities	Accelerator Tests	Tests	10,000	1,773	2,494
Material Inventories	Nuclear Inventory	Depleted Uranium	µg	100	0	0
	Radioactive Material Inventory	NA	Ci	0	0	0
	Spent Fuel Inventory	NA	kg	0	0	0
	Explosives Inventory	NA	g	0	0	0
	Other Hazardous Material Inventory	Insulator Oil	gal	6,000	6,000	6,000
Material Consumption	Nuclear Material Consumption	Depleted Uranium	µg	100	0	0
	Radioactive Material Consumption	NA	Ci	0	0	0
	Explosives Consumption	NA	g	0	0	0
Waste Generation	Low-Level Waste	NA	ft^3	0	0	0
	Transuranic Waste	NA	ft^3	0	0	0
	Mixed Waste	LLMW	ft^3	0	0	0
		Mixed TRU	ft^3	0	0	0
	Hazardous Waste	NA	kg	10	0	1
Emissions	Radioactive Air Emissions	NA	Ci	0	0	0
	Open Burning	NA	gal/burn	0	0	0
Process Support	Wastewater Effluent	NA	M gal	0	0	0
	Water Consumption	NA	M gal	0	0	0
	Electricity Consumption	NA	kWh	0	0	0
	Boiler Energy	NA	ft^3	0	0	0
	Facility Personnel	NA	FTEs	10	1.8	2.5
	Expenditures	NA	M Dollars	5.5	1.2	1.3

Table 4-1. Summary of Operational Data from Selected Facilities (Continued)

Category	Description	Activity Type or Material	Units (per Year)	SWEIS Expanded Alternative	Data Reported for FY2000	FY2001
RHEPP II (TA-IV) FY2001 Update (Section 4.3.5)						
Major Facility Activities	Test Activities	Radiation Production	Tests	800	0	0
Material Inventories	Nuclear Inventory	NA	µg	0	0	0
	Radioactive Material Inventory	NA	Ci	0	0	0
	Spent Fuel Inventory	NA	kg	0	0	0
	Explosives Inventory	NA	g	0	0	0
	Other Hazardous Material Inventory	Insulator Oil	gal	5,000	5,000	5,000
		Food Products	lb	100	0	0
Material Consumption	Nuclear Material Consumption	NA	µg	0	0	0
	Radioactive Material Consumption	NA	Ci	0	0	0
	Explosives Consumption	NA	g	0	0	0
Waste Generation	Low-Level Waste	NA	ft^3	0	0	0
	Transuranic Waste	NA	ft^3	0	0	0
	Mixed Waste	LLMW	ft^3	0	0	0
		Mixed TRU	ft^3	0	0	0
	Hazardous Waste	NA	kg	1	0	0
Emissions	Radioactive Air Emissions	NA	Ci	0	0	0
	Open Burning	NA	gal/burn	0	0	0
Process Support	Wastewater Effluent	NA	M gal	0	0	0
	Water Consumption	NA	M gal	0	0	0
	Electricity Consumption	NA	kWh	0	0	0
	Boiler Energy	NA	ft^3	0	0	0
	Facility Personnel	NA	FTEs	3	0.25	0.25
	Expenditures	NA	M Dollars	0.754	0	0

Table 4-1. Summary of Operational Data from Selected Facilities (Continued)

Category	Description	Activity Type or Material	Units (per Year)	SWEIS Expanded Alternative	Data Reported for FY2000	FY2001
SABRE (TA-IV) FY2001 Update (Section 4.3.6)						
Major Facility Activities	Test Activities	Irradiation of Components or Materials	Shots	400	300	150
Material Inventories	Nuclear Inventory	NA	µg	0	0	0
	Radioactive Material Inventory	NA	Ci	0	0	0
	Spent Fuel Inventory	NA	kg	0	0	0
	Explosives Inventory	NA	g	0	0	0
	Other Hazardous Material Inventory	Insulator Oil	gal	30,000	30,000	30,000
Material Consumption	Nuclear Material Consumption	NA	µg	0	0	0
	Radioactive Material Consumption	NA	Ci	0	0	0
	Explosives Consumption	NA	g	0	0	0
Waste Generation	Low-Level Waste	NA	ft^3	0	0	0
	Transuranic Waste	NA	ft^3	0	0	0
	Mixed Waste	LLMW	ft^3	0	0	0
		Mixed TRU	ft^3	0	0	0
	Hazardous Waste	NA	kg	132	0	0
Emissions	Radioactive Air Emissions	NA	Ci	0	0	0
	Open Burning	NA	gal/burn	0	0	0
Process Support	Wastewater Effluent	NA	M gal	0	0	0
	Water Consumption	NA	M gal	0	0	0
	Electricity Consumption	NA	kWh	0	0	0
	Boiler Energy	NA	ft^3	0	0	0
	Facility Personnel	NA	FTEs	6	4	3
	Expenditures	NA	M Dollars	0.96	1	0

Table 4-1. Summary of Operational Data from Selected Facilities (Continued)

Category	Description	Activity Type or Material	Units (per Year)	SWEIS Expanded Alternative	Data Reported for FY2000	FY2001
Saturn (TA-IV) FY2001 Update (Section 4.3.7)						
Major Facility Activities	Test Activities	Irradiation of Components or Materials	Shots	500	137	111
Material Inventories	Nuclear Inventory	NA	Ci	0	0	0
	Radioactive Material Inventory	NA	Ci	0	0	0
	Spent Fuel Inventory	NA	kg	0	0	0
	Explosives Inventory	NA	g	0	0	0
	Other Hazardous Material Inventory	Insulator Oil	gal	300,000	300,000	300,000
Material Consumption	Nuclear Material Consumption	NA	Ci	0	0	0
	Radioactive Material Consumption	NA	Ci	0	0	0
	Explosives Consumption	NA	g	0	0	0
Waste Generation	Low-Level Waste	NA	ft^3	0	0	0
	Transuranic Waste	NA	ft^3	0	0	0
	Mixed Waste	LLMW	ft^3	0	0	0
		Mixed TRU	ft^3	0	0	0
	Hazardous Waste	NA	kg	1,286	480	193.74
Emissions	Radioactive Air Emissions	NA	Ci	0	0	0
	Open Burning	NA	gal/burn	0	0	0
Process Support	Wastewater Effluent	NA	M gal	0	0	0
	Water Consumption	NA	M gal	0	0	0
	Electricity Consumption	NA	kWh	0	0	0
	Boiler Energy	NA	ft^3	0	0	0
	Facility Personnel	NA	FTEs	27	14	14
	Expenditures	NA	M Dollars	5.4	2.8	2.8

Table 4-1. Summary of Operational Data from Selected Facilities (Continued)

Category	Description	Activity Type or Material	Units (per Year)	SWEIS Expanded Alternative	Data Reported for FY2000	FY2001
SPHINX (TA-IV) FY2001 Update (Section 4.3.8)						
Major Facility Activities	Test Activities	Irradiation of Components or Materials	Shots	6,000	1,338	1,599
Material Inventories	Nuclear Inventory	NA	µg	0	0	0
	Radioactive Material Inventory	NA	Ci	0	0	0
	Spent Fuel Inventory	NA	kg	0	0	0
	Explosives Inventory	NA	g	0	0	0
	Other Hazardous Material Inventory	Insulator Oil	gal	1,000	1,000	1,000
Material Consumption	Nuclear Material Consumption	NA	µg	0	0	0
	Radioactive Material Consumption	NA	Ci	0	0	0
	Explosives Consumption	NA	g	0	0	0
Waste Generation	Low-Level Waste	NA	ft^3	0	0	0
	Transuranic Waste	NA	ft^3	0	0	0
	Mixed Waste	LLMW	ft^3	0	0	0
		Mixed TRU	ft^3	0	0	0
	Hazardous Waste	NA	kg	107	94	35
Emissions	Radioactive Air Emissions	NA	Ci	0	0	0
	Open Burning	NA	kg	0	0	0
Process Support	Wastewater Effluent	NA	M gal	0	0	0
	Water Consumption	NA	M gal	0	0	0
	Electricity Consumption	NA	kWh	0	0	0
	Boiler Energy	NA	ft^3	0	0	0
	Facility Personnel	NA	FTEs	5	2	0
	Expenditures	NA	M Dollars	0.71	0.45	0.4

Table 4-1. Summary of Operational Data from Selected Facilities (Continued)

Category	Description	Activity Type or Material	Units (per Year)	SWEIS Expanded Alternative	Data Reported for FY2000	FY2001
TESLA (TA-IV) FY2001 Update (Section 4.3.9)						
Major Facility Activities	Test Activities	Accelerator Shots	shots	1,300	37	50
Material Inventories	Nuclear Inventory	NA	µg	0	0	0
	Radioactive Material Inventory	NA	Ci	0	0	0
	Spent Fuel Inventory	NA	kg	0	0	0
	Explosives Inventory	NA	g	0	0	0
	Other Hazardous Material Inventory	Insulator Oil	gal	10,000	20,000	20,000
Material Consumption	Nuclear Material Consumption	NA	µg	0	0	0
	Radioactive Material Consumption	NA	Ci	0	0	0
	Explosives Consumption	NA	g	0	0	0
Waste Generation	Low-Level Waste	NA	ft^3	0	0	0
	Transuranic Waste	NA	ft^3	0	0	0
	Mixed Waste	LLMW	ft^3	0	0	0
		Mixed TRU	ft^3	0	0	0
	Hazardous Waste	NA	kg	65	150	100
Emissions	Radioactive Air Emissions	NA	Ci	0	0	0
	Open Burning	NA	gal/burn	0	0	0
Process Support	Wastewater Effluent	NA	M gal	0	0	0
	Water Consumption	NA	M gal	0	0	0
	Electricity Consumption	NA	kWh	0	0	0
	Boiler Energy	NA	ft^3	0	0	0
	Facility Personnel	NA	FTEs	5	2	2.5
	Expenditures	NA	M Dollars	1.6	0.5	0.5

Table 4-1. Summary of Operational Data from Selected Facilities (Continued)

Category	Description	Activity Type or Material	Units (per Year)	SWEIS Expanded Alternative	Data Reported for FY2000	FY2001
Z Accelerator (TA-IV) FY2001 Update (Section 4.3.10)						
Major Facility Activities	Test Activities	Tritium	Shots	75	0	0
		Deuterium	Shots	100	8	6
		Plutonium-239	Shots	50	0	0
		Depleted Uranium	Shots	50	0	4
		Other	Shots	75	145	152
		NA	Total Shots	350	153	162
Material Inventories	Nuclear Inventory	Tritium	Ci	50,000	0	0
		Deuterium	l	<5,000	350	350
		Plutonium-239	mg	NAPD	NAPD	NAPD
		Depleted Uranium	mg	NAPD	NAPD	NAPD
	Radioactive Material Inventory	Activated Hardware	kg	10,000	2,000	2,000
	Spent Fuel Inventory	NA	kg	0	0	0
	Explosives Inventory	Bare UNO 1.1	g	1,500	0	0
	Other Hazardous Material Inventory	Insulator Oil	gal	700,000	700,000	700,000
Material Consumption	Nuclear Material Consumption	Tritium	Ci	7,500	0	0
		Deuterium	l	5,000	350	350
		Plutonium-239	mg	2,000	0	0
		Depleted Uranium	mg	2,000	0	8,224
	Radioactive Material Consumption	NA	Ci	0	0	0
	Explosives Consumption	Bare UNO 1.1	g	37,500	0	0
Waste Generation	Low-Level Waste	NA	ft^3	28	5	10
	Transuranic Waste	NA	ft^3	16	0	0
	Mixed Waste	LLMW	ft^3	0	0	0
		Mixed TRU	ft^3	0	0	0
	Hazardous Waste	NA	kg	1,250	1,000	1,233
Emissions	Radioactive Air Emissions	Tritium	Ci	0	0	0
	Open Burning	NA	gal/burn	0	0	0
Process Support	Wastewater Effluent	NA	M gal	0	0	0
	Water Consumption	NA	M gal	0	0	0
	Electricity Consumption	NA	kWh	0	0	0
	Boiler Energy	NA	ft^3	0	0	0
	Facility Personnel	NA	FTEs	115	50	55
	Expenditures	NA	M Dollars	4	1.8	1.82

Table 4-1. Summary of Operational Data from Selected Facilities (Continued)

Category	Description	Activity Type or Material	Units (per Year)	SWEIS Expanded Alternative	Data Reported for FY2000	FY2001
ACRR Pulse Mode (TA-V) FY2001 Update (Section 4.4.1)						
Major Facility Activities	Test Activities	Irradiation Tests	Test Series	2 to 3	3	5
Material Inventories[d]	Inventory Nuclear Material	Enriched Uranium	kg	85	12	12
		Plutonium-239	g	NAPD	NAPD	NAPD
	Radioactive Material Inventory	Cobalt-60	Ci	33.6	33.6	33.6
		Other Radioisotopes	Ci	0	3,500	3,500
	Spent Fuel Inventory	NA	kg	0	0	0
	Explosives Inventory	Bare UNO 1.2	g	500	500	500
	Other Hazardous Material Inventory	NA	kg	0	0	0
Material Consumption	Nuclear Material Consumption	Enriched Uranium	g	2	2	2
	Radioactive Material Consumption	NA	Ci	0	0	0
	Explosives Consumption	NA	kg	0	0	0
Waste Generation	Low-Level Waste	NA	ft^3	170	0	0
	Transuranic Waste	NA	ft^3	5	5	5
	Mixed Waste	LLMW	ft^3	5	5	5
		Mixed TRU	ft^3	5	0	0
	Hazardous Waste	NA	ft^3	14	14	14
Emissions	Radioactive Air Emissions	Argon-41	Ci	7.8	30	39
	Open Burning	NA	gal/burn	0	0	0
Process Support	Wastewater Effluent	NA	M gal	50,000	50,000	50,000
	Water Consumption	NA	M gal	100,000	100,000	100,000
	Electricity Consumption	NA	kWh	0	1,000	1,000
	Boiler Energy	NA	ft^3	0	0	0
	Facility Personnel	NA	FTEs	8	4	4
	Expenditures	NA	M Dollars	8	4	4

Table 4-1. Summary of Operational Data from Selected Facilities (Continued)

Category	Description	Activity Type or Material	Units (per Year)	SWEIS Expanded Alternative	Data Reported for FY2000	FY2001
GIF (TA-V) FY2001 Update (Section 4.4.3)						
Major Facility Activities	Test Activities	Tests	Hours	8,000	0	0
Material Inventories	Nuclear Inventory	NA	kg	0	0	0
	Radioactive Material Inventory	NA	Ci	0	0	0
	Spent Fuel Inventory	NA	kg	0	0	0
	Explosives Inventory	Bare UNO 1.1	g	500	0	0
	Other Hazardous Material Inventory	NA	kg	0	0	0
Material Consumption	Nuclear Material Consumption	NA	Ci	0	0	0
	Radioactive Material Consumption	NA	Ci	0	0	0
	Explosives Consumption	NA	kg	0	0	0
Waste Generation	Low-Level Waste	NA	ft^3	126	0	0
	Transuranic Waste	NA	ft^3	0	0	0
	Mixed Waste	LLMW	ft^3	0	0	0
		Mixed TRU	ft^3	0	0	0
	Hazardous Waste	NA	ft^3	14	0	0
Emissions	Radioactive Air Emissions	NA	Ci	0	0	0
	Open Burning	NA	gal/burn	0	0	0
Process Support	Wastewater Effluent	NA	M gal	0	0	0
	Water Consumption	NA	M gal	17,000	17,000	17,000
	Electricity Consumption	NA	kWh	0	0	0
	Boiler Energy	NA	ft^3	0	0	0
	Facility Personnel	NA	FTEs	3	0	0
	Expenditures	NA	M Dollars	0	0	0

Table 4-1. Summary of Operational Data from Selected Facilities (Continued)

Category	Description	Activity Type or Material	Units (per Year)	SWEIS Expanded Alternative	Data Reported for FY2000	FY2001
Hot Cell Facility (TA-V) FY2001 Update (Section 4.4.4)						
Major Facility Activities	Test Activities	Processing	Targets	1,300	0	0
Material Inventories[d]	Nuclear Material Inventory	Enriched Uranium	g	125	0	0
	Radioactive Material Inventory	NA	Ci	3.9	0	0
	Spent Fuel Inventory	Spent Fuel	kg	399	0	0
	Explosives Inventory	Bare UNO 1.2	g	500	0	0
	Other Hazardous Material Inventory	NA	kg	0	0	0
Material Consumption	Nuclear Material Consumption	Enriched Uranium	kg	32.5	0	0
	Radioactive Material Consumption	NA	Ci	0	0	0
	Explosives Consumption	NA	kg	0	0	0
Waste Generation	Low-Level Waste	NA	ft^3	5,000	0	0
	Transuranic Waste	NA	ft^3	0	0	0
	Mixed Waste	LLMW	ft^3	40	0	0
		Mixed TRU	ft^3	0	0	0
	Hazardous Waste	NA	ft^3	22	0	0
Emissions	Radioactive Air Emissions	Tritium	Ci	2.2	0	0
		Argon-41	Ci	2.2	0	0
	Open Burning	NA	gal/burn	0	0	0
Process Support	Wastewater Effluent	NA	M gal	0	0	0
	Water Consumption	NA	M gal	0	0	0
	Electricity Consumption	NA	kWh	0	0	0
	Boiler Energy	NA	ft^3	0	0	0
	Facility Personnel	NA	FTEs	55	0	0
	Expenditures	NA	M Dollars	0	0	0

Table 4-1. Summary of Operational Data from Selected Facilities (Continued)

Category	Description	Activity Type or Material	Units (per Year)	SWEIS Expanded Alternative	Data Reported for FY2000	FY2001
New GIF (TA-V) FY2001 Update (Section 4.4.5)						
Major Facility Activities	Test Activities	Tests	hrs	24,000	0	0
Material Inventories[d]	Nuclear Inventory	NA	kg	0	0	0
	Radioactive Material Inventory	Cobalt-60	Ci	NAPD	NAPD	NAPD
	Spent Fuel Inventory	NA	kg	0	0	0
	Explosives Inventory	Bare UNO 1.1	g	500	0	0
	Other Hazardous Material Inventory	NA	kg	0	0	0
Material Consumption	Nuclear Material Consumption	NA	Ci	0	0	0
	Radioactive Material Consumption	NA	Ci	0	0	0
	Explosives Consumption	NA	kg	0	0	0
Waste Generation	Low-Level Waste	NA	ft^3	126	0	2
	Transuranic Waste	NA	ft^3	0	0	0
	Mixed Waste	LLMW	ft^3	0	0	0
		Mixed TRU	ft^3	0	0	0
	Hazardous Waste	NA	ft^3	14	0	1
Emissions	Radioactive Air Emissions	NA	Ci	0	0	0
	Open Burning	NA	gal/burn	0	0	0
Process Support	Wastewater Effluent	NA	M gal	0	0	0
	Water Consumption	NA	M gal	255,000	200,000	200,000
	Electricity Consumption	NA	kWh	0	20	20
	Boiler Energy	NA	ft^3	0	0	0
	Facility Personnel	NA	FTEs	4	2	2
	Expenditures	NA	M Dollars	1	1	1

Table 4-1. Summary of Operational Data from Selected Facilities (Continued)

Category	Description	Activity Type or Material	Units (per Year)	SWEIS Expanded Alternative	Data Reported for FY2000	FY2001
Sandia Pulsed Reactor (SPR) (TA-V) FY2001 Update (Section 4.4.6)						
Major Facility Activities	Test Activities	Irradiation Tests	Tests	200	100	0
Material Inventories[d]	Nuclear Inventory	Plutonium-239	g	NAPD	NAPD	NAPD
		Enriched Uranium	kg	1,000	600	0
	Radioactive Material Inventory	NA	Ci	0	0	0
	Spent Fuel Inventory	NA	kg	0	0	0
	Explosives Inventory	Bare UNO 1.1	g	1,000	1,000	0
	Other Hazardous Material Inventory	NA	kg	0	0	0
Material Consumption	Nuclear Material Consumption	NA	Ci	0	0	0
	Radioactive Material Consumption	NA	Ci	0	0	0
	Explosives Consumption	NA	kg	0	0	0
Waste Generation	Low-Level Waste	NA	kg	900	440	10
	Transuranic Waste	NA	ft^3	5	0	0
	Mixed Waste	LLMW	ft^3	14	4	0
		Mixed TRU	ft^3	5	0	0
	Hazardous Waste	NA	ft^3	30	7	1
Emissions	Radioactive Air Emissions	Argon-41	Ci	30.0	9.5	0
	Open Burning	NA	gal/burn	0	0	0
Process Support	Wastewater Effluent	NA	M gal	0	0	0
	Water Consumption	NA	M gal	0	0	0
	Electricity Consumption	NA	kWh	0	0	0
	Boiler Energy	NA	ft^3	0	0	0
	Facility Personnel	NA	FTEs	17	10	4
	Expenditures	NA	M Dollars	6	4	4

Table 4-1. Summary of Operational Data from Selected Facilities (Continued)

Category	Description	Activity Type or Material	Units (per Year)	SWEIS Expanded Alternative	Data Reported for FY2000	FY2001
Aerial Cable Facility Complex (Sol Se Mete Canyon) FY2001 Update (Section 4.5.1)						
Major Facility Activities	Test Activities	Drop/Pull-Down	Tests	100	9	5
		Aerial Target	Tests	30	2	0
		Scoring System Tests	Series	2	0	0
Material Inventories	Nuclear Material Inventory	NA	kg	0	0	0
	Radioactive Material Inventory	NA	Ci	0	0	0
	Spent Fuel Inventory	NA	kg	0	0	0
	Explosives Inventory	NA	g	0	0	0
	Other Hazardous Material Inventory	NA	kg	0	0	0
Material Consumption	Nuclear Material Consumption	NA	g	0	0	0
	Radioactive Material Consumption	NA	Ci	0	0	0
	Explosives Consumption	Bare UNO 1.1	kg	78.8	9.5	4
		Bare UNO 1.3 (Rocket Motors)	kg	22,930	1,112	900
		Bare UNO 1.4	g	2,314	205	150
Waste Generation	Low-Level Waste	NA	ft^3	0	2	0
	Transuranic Waste	NA	ft^3	0	0	0
	Mixed Waste	LLMW	ft^3	0	0	0
		Mixed TRU	ft^3	0	0	0
	Hazardous Waste	NA	kg	9	4.3	4
Emissions	Radioactive Air Emissions	NA	Ci	0	0	0
	Open Burning	NA	gal/burn	0	0	0
Process Support	Wastewater Effluent	NA	M gal	0	0	0
	Water Consumption	NA	M gal	0	0	0
	Electricity Consumption	NA	kWh	0	0	0
	Boiler Energy	NA	ft^3	0	0	0
	Facility Personnel	NA	FTEs	24	8	8
	Expenditures	NA	M Dollars	0.75	0.20	0.18

Table 4-1. Summary of Operational Data from Selected Facilities (Continued)

Category	Description	Activity Type or Material	Units (per Year)	SWEIS Expanded Alternative	Data Reported for FY2000	FY2001
CTTF-West (in Coyote Test Field) FY2001 Update (Section 4.5.2)						
Major Facility Activities	Survivability Testing	Test Series	Test Series	2	1	0
Material Inventories	Nuclear Material Inventory	NA	kg	0	0	0
	Radioactive Material Inventory	NA	Ci	0	0	0
	Sealed Source Inventory	NA	Ci	0	0	0
	Spent Fuel Inventory	NA	kg	0	0	0
	Explosives Inventory	NA	g	0	0	0
	Other Hazardous Material Inventory	Adhesives	g	500	500	500
Material Consumption	Nuclear Material Consumption	NA	g	0	0	0
	Radioactive Material Consumption	NA	Ci	0	0	0
	Explosives Consumption	NA	kg	0	0	0
Waste Generation	Low-Level Waste	NA	ft^3	0	0	0
	Transuranic Waste	NA	ft^3	0	0	0
	Mixed Waste	LLMW	ft^3	0	0	0
		Mixed TRU	ft^3	0	0	0
	Hazardous Waste	NA	g	100	100	100
Emissions	Radioactive Air Emissions	NA	Ci	0	0	0
	Open Burning	NA	gal/burn	0	0	0
Process Support	Wastewater Effluent	NA	gal	0	0	0
	Water Consumption	NA	M gal	0	0	0
	Electricity Consumption	NA	kWh	0	0	0
	Boiler Energy	NA	ft^3	0	0	0
	Facility Personnel	NA	FTEs	12	12	4
	Expenditures	NA	M Dollars	2	3	3

Table 4-1. Summary of Operational Data from Selected Facilities (Continued)

Category	Description	Activity Type or Material	Units (per Year)	SWEIS Expanded Alternative	Data Reported for FY2000	FY2001
Explosives Applications Laboratory (in Coyote Test Field) FY2001 Update (Section 4.5.3)						
Major Facility Activities	Explosive Testing	Tests	Tests	275 to 360	138	180
Material Inventories	Nuclear Material Inventory	NA	kg	0	0	0
	Radioactive Material Inventory	NA	Ci	0	0	0
	Spent Fuel Inventory	NA	kg	0	0	0
	Explosives Inventory	Bare UNO 1.1	g	NAPD	NAPD	NAPD
		Bare UNO 1.2	g	NAPD	NAPD	NAPD
		Bare UNO 1.3	g	NAPD	NAPD	NAPD
		Bare UNO 1.4	g	NAPD	NAPD	NAPD
	Other Hazardous Material Inventory	Film Developer/Fixer	gal	20	20	30
Material Consumption	Nuclear Material Consumption	NA	g	0	0	0
	Radioactive Material Consumption	NA	Ci	0	0	0
	Explosives Consumption	Bare UNO 1.1	g	NAPD	NAPD	NAPD
		Bare UNO 1.2	g	NAPD	NAPD	NAPD
		Bare UNO 1.3	g	NAPD	NAPD	NAPD
		Bare UNO 1.4	g	NAPD	NAPD	NAPD
Waste Generation	Low-Level Waste	NA	ft^3	0	0	0
	Transuranic Waste	NA	ft^3	0	0	0
	Mixed Waste	LLMW	ft^3	0	0	0
		Mixed TRU	ft^3	0	0	0
	Hazardous Waste	NA	kg	1.5 to 2	1.5	1.5
Emissions	Radioactive Air Emissions	NA	Ci	0	0	0
	Open Burning	NA	gal/burn	0	0	0
Process Support	Wastewater Effluent	NA	gal	0	0	0
	Water Consumption	NA	M gal	0	0	0
	Electricity Consumption	NA	kWh	0	0	0
	Boiler Energy	NA	ft^3	0	0	0
	Facility Personnel	NA	FTEs	6	4	5
	Expenditures	NA	M Dollars	0.975	.80	.81

Table 4-1. Summary of Operational Data from Selected Facilities (Continued)

Category	Description	Activity Type or Material	Units (per Year)	SWEIS Expanded Alternative	Data Reported for FY2000	FY2001
Lurance Canyon Burn Site FY2001 Update (Section 4.5.4)						
Major Facility Activities	Test Activities	Certification	Tests	55	10	8
		Model Validation	Tests	100	50	45
		User Testing	Tests	50	35	20
Material Inventories	Nuclear Material Inventory	NA	kg	0	0	0
	Radioactive Material Inventory	NA	Ci	0	0	0
	Spent Fuel Inventory	NA	kg	0	0	0
	Explosives Inventory	NA	g	0	0	0
	Other Hazardous Material Inventory	NA	kg	0	0	0
Material Consumption	Nuclear Material Consumption	NA	g	0	0	0
	Radioactive Material Consumption	NA	Ci	0	0	0
	Explosives Consumption	NA	kg	0	0	0
Waste Generation	Low-Level Waste	NA	ft^3	0	0	0
	Transuranic Waste	NA	ft^3	0	0	0
	Mixed Waste	LLMW	ft^3	0	0	0
		Mixed TRU	ft^3	0	0	0
	Hazardous Waste	NA	kg	900	900	900
Emissions	Radioactive Air Emissions	NA	Ci	0	0	0
	Open Burning	JP-8	gal/burn	25,000/50	5,000/15	25,000/65
		Wood	kg/burn	5,000/10	1,000/2	1,000/2
		Rocket Propellant	kg/burn	7,500/5	0/0	0/0
Process Support	Wastewater Effluent	NA	gal	25,000	25,000	25,000
	Water Consumption	NA	gal	0	10,000	10,000
	Electricity Consumption	NA	kWh	0	0	0
	Boiler Energy	NA	ft^3	0	0	0
	Facility Personnel	NA	FTEs	11	4.5	4.5
	Expenditures	NA	M Dollars	0.65	0.25	0.25

Table 4-1. Summary of Operational Data from Selected Facilities (Continued)

Category	Description	Activity Type or Material	Units (per Year)	SWEIS Expanded Alternative	Data Reported for FY2000	FY2001
Thunder Range Complex (in Coyote Test Field) FY2001 Update (Section 4.5.5)						
Major Facility Activities	Other	Equipment Disassembly And Evaluation	Days	144	42	5
	Other	Ground Truthing Tests	Test Series	10	1	1
Material Inventories[d]	Nuclear Material Inventory	Plutonium-238	Ci	= 0.62	= 0.62	= 0.62
		Plutonium-239	Ci	= 0.52	= 0.52	= 0.52
		Americium-241	Ci	= 0.52	= 0.52	= 0.52
		Americium-243	Ci	= 0.52	= 0.52	= 0.52
		Normal Uranium	Ci	= 4.2	= 4.2	= 4.2
	Radioactive Material Inventory	NA	Ci	0	0	0
	Spent Fuel Inventory	NA	kg	0	0	0
	Explosives Inventory	Bare UNO 1.1	g	436	436	436
	Other Hazardous Material Inventory	NA	NA	0	0	0
Material Consumption	Nuclear Material Consumption	NA	g	0	0	0
	Radioactive Material Consumption	NA	Ci	0	0	0
	Explosives Consumption	NA	g	0	0	0
Waste Generation	Low-Level Waste	NA	ft^3	0	0	0
	Transuranic Waste	NA	ft^3	0	0	0
	Mixed Waste	LLMW	ft^3	0	0	0
		Mixed TRU	ft^3	0	0	0
	Hazardous Waste	NA	kg	0	0	0
Emissions	Radioactive Air Emissions	NA	Ci	0	0	0
	Open Burning	NA	gal	0	0	0
Process Support	Wastewater Effluent	NA	gal	0	0	0
	Water Consumption	NA	M gal	0	0	0
	Electricity Consumption	NA	kWh	0	0	0
	Boiler Energy	NA	ft^3	0	0	0
	Facility Personnel	NA	FTEs	2.6	0.8	0.8
	Expenditures	NA	dollars	300,000	25,000	10,000

Table 4-1. Summary of Operational Data from Selected Facilities (Continued)

Category	Description	Activity Type or Material	Units (per Year)	SWEIS Expanded Alternative	Data Reported for FY2000	FY2001
HWMF (South of TA-I) FY2001 Update (Section 4.6.1)						
Major Facility Activities	Infrastructure	Collection, Packaging, Handling, and Short-Term Storage of Hazardous and Other Toxic Waste	kg	214,000	73,560	66,559
Material Inventories	Nuclear Material Inventory	NA	kg	0	0	0
	Radioactive Material Inventory	NA	Ci	0	0	0
	Sealed Source Inventory	NA	Ci	0	0	0
	Spent Fuel Inventory	NA	kg	0	0	0
	Explosives Inventory	NA	g	0	0	0
	Other Hazardous Material Inventory	Propane	lb	1,188	924	900
Material Consumption	Nuclear Material Consumption	NA	g	0	0	0
	Radioactive Material Consumption	NA	Ci	0	0	0
	Explosives Consumption	NA	kg	0	0	0
Waste Generation	Low-Level Waste	NA	ft^3	0	0	0
	Transuranic Waste	NA	ft^3	0	0	0
	Mixed Waste	LLMW	ft^3	0	0	0
		Mixed TRU	ft^3	0	0	0
	Hazardous Waste	NA	kg	860	485	1,045
Emissions	Radioactive Air Emissions	NA	Ci	0	0	0
	Open Burning	NA	gal/burn	0	0	0
Process Support	Wastewater Effluent	NA	M gal	0	0	0
	Water Consumption	NA	M gal	0	0	0
	Electricity Consumption	NA	kWh	0	0	0
	Boiler Energy	NA	ft^3	0	0	0
	Facility Personnel	NA	FTEs	35	11	13
	Expenditures	NA	M Dollars	2.7	1.2	1.97

Table 4-1. Summary of Operational Data from Selected Facilities (Continued)

Category	Description	Activity Type or Material	Units (per Year)	SWEIS Expanded Alternative	Data Reported for FY2000	FY2001
RMWMF (TA-III) FY2001 Update (Section 4.6.2)						
Major Facility Activities	Infrastructure	Receipt, Packaging, and Shipping of Radioactive Waste	lb	2.7 M	0.250 M	1.9 M
Material Inventories	Nuclear Material Inventory	NA	kg	0	0	0
	Radioactive Material Inventory	NA	Ci	0	0	0
	Spent Fuel Inventory	NA	kg	0	0	0
	Explosives Inventory	Bare UNO 1.2	g	0	9	<1
	Other Hazardous Material Inventory	Propane	gal	6,630	6,630	6,630
		Liquid Nitrogen	l	8,320	8,320	8,320
Material Consumption	Nuclear Material Consumption	NA	g	0	0	0
	Radioactive Material Consumption	NA	Ci	0	0	0
	Explosives Consumption	NA	kg	0	0	0
Waste Generation	Low-Level Waste	NA	ft^3	19,592	11,798	10,202
	Transuranic Waste	NA	ft^3	353	48	0
	Mixed Waste	LLMW	ft^3	8,833	394	364
		Mixed TRU	ft^3	27	24	1
	Hazardous Waste	NA	kg	0	0	0
Emissions	Radioactive Air Emissions	Tritium	Ci	2.203	2.203	6.43E-2
		Sr-90	Ci	0	0	3.83E-7
		AM-241	Ci	0	0	2.52E-7
		CS-137	Ci	0	0	1.06E-8
	Open Burning	NA	gal/burn	0	0	0
Process Support	Wastewater Effluent	NA	M gal	0	0	0
	Water Consumption	NA	M gal	0	0	0
	Electricity Consumption	NA	kWh	0	0	0
	Boiler Energy	NA	ft^3	0	0	0
	Facility Personnel	NA	FTEs	49	39	39
	Expenditures	NA	M Dollars	0.528	8	8

Table 4-1. Summary of Operational Data from Selected Facilities (Continued)

Category	Description	Activity Type or Material	Units (per Year)	SWEIS Expanded Alternative	Data Reported for FY2000	FY2001
Steam Plant (TA-I) FY2001 Update (Section 4.6.3)						
Major Facility Activities	Infrastructure	Generate and Distribute Steam to DOE, TA-I, KAFB East, Coronado Club	lb	544 M	517 M	529 M
Material Inventories	Nuclear Material Inventory	NA	kg	0	0	0
	Radioactive Material Inventory	NA	Ci	0	0	0
	Spent Fuel Inventory	NA	kg	0	0	0
	Explosives Inventory	NA	g	0	0	0
	Other Hazardous Material Inventory	Diesel Fuel	M gal	1.5	1.5	.75
		Propane	gal	300	0	300
		Water Treatment Chemicals	gal	1,752	1,752	1,752
Material Consumption	Nuclear Material Consumption	NA	g	0	0	0
	Radioactive Material Consumption	NA	Ci	0	0	0
	Explosives Consumption	NA	kg	0	0	0
Waste Generation	Low-Level Waste	NA	ft^3	0	0	0
	Transuranic Waste	NA	ft^3	0	0	0
	Mixed Waste	LLMW	ft^3	0	0	0
		Mixed TRU	ft^3	0	0	0
	Hazardous Waste	NA	kg	9	9	9
Emissions	Radioactive Air Emissions	NA	Ci	0	0	0
	Open Burning	NA	gal/burn	0	0	0
Process Support	Wastewater Effluent	NA	M gal	0	0	0
	Water Consumption	NA	M gal	18	0	0
	Electricity Consumption	NA	kWh	1.2 M	1.2 M	1.2 M
	Boiler Energy	NA	ft^3	779 M	806 M	806 M
	Facility Personnel	NA	FTEs	17	14	16
	Expenditures	NA	M dollars	2.87	2.8	2.8

Table 4-1. Summary of Operational Data from Selected Facilities (Continued)

Category	Description	Activity Type or Material	Units (per Year)	SWEIS Expanded Alternative	Data Reported for FY2000	FY2001
Thermal Treatment Facility (TTF) (TA-III) FY2001 Update (Section 4.6.4)						
Major Facility Activities	Infrastructure	Treatment of Waste	lb	1,200	2.95	0
Material Inventories	Nuclear Material Inventory	NA	kg	0	0	0
	Radioactive Material Inventory	NA	Ci	0	0	0
	Spent Fuel Inventory	NA	kg	0	0	0
	Explosives Inventory	Bare UNO 1.1	g	10,366	5.05	0
		Bare UNO 1.3	g	165.7	0	0
	Other Hazardous Material Inventory	Propane	gal	500	500	0
Material Consumption	Nuclear Material Consumption	NA	g	0	0	0
	Radioactive Material Consumption	NA	Ci	0	0	0
	Explosives Consumption	NA	kg	0	0	0
Waste Generation	Low-Level Waste	NA	ft^3	0	0	0
	Transuranic Waste	NA	ft^3	0	0	0
	Mixed Waste	LLMW	ft^3	0	0	0
		Mixed TRU	ft^3	0	0	0
	Hazardous Waste	NA	kg	272	0	0
Emissions	Radioactive Air Emissions	NA	Ci	0	0	0
	Open Burning	Propane	gal	120	8	0
Process Support	Wastewater Effluent	NA	M gal	0	0	0
	Water Consumption	NA	M gal	0	0	0
	Electricity Consumption	NA	kWh	0	0	0
	Boiler Energy	NA	ft^3	0	0	0
	Facility Personnel	NA	FTEs	1	0.1	0.1
	Expenditures	NA	Dollars	100,000	10,000	0

[a]Not Available for Public Distribution.
[b]The average annual inventory of test articles stored at the ECF.
[c]The sample of depleted uranium was used in remote sensing and calibration of lasers, and was stored in the facility.
[d]Nuclear and radioactive material inventories listed here are bounding quantities for facility accident analysis and do not represent actual quantities in inventory at a facility. In addition, material inventories are not necessarily stored in facilities where they are used.
Source: SNL, 2002i.

4.8 Storage Tanks at SNL/NM

Table 4-2 shows information on aboveground oil and fuel storage tanks at SNL/NM TA-I, including descriptions, locations, contents, capacities, containment, and other information. Table 4-3 shows information on other storage tanks at SNL/NM, including those that store chemicals.

Table 4-2. Oil and Fuel Storage Tanks at SNL/NM TA-I

Building	Location	Capacity (gal)	Containment	Contents	Description
605	Outside, east	10,000	Metallic	Diesel #2	Aboveground fuel storage tank
605	Tank from outside, south	209,421	Earthen	Diesel #2	Aboveground fuel storage tank
605	Outside, east	10,000	Metallic	Diesel #2	Aboveground fuel storage tank
605	Tank from outside, south	45,490	Earthen	Diesel #2	Aboveground fuel storage tank
605	Outside, east	10,000	Metallic	Diesel #2	Aboveground fuel storage tank
605	Tank from outside, south	44,129	Earthen	Diesel #2	Aboveground fuel storage tank
605	Tank from outside, south	213,898	Earthen	Diesel #2, empty, not in use	Aboveground fuel storage tank
605	Tank from outside, south	508,000	Earthen	Diesel #2, in service	Aboveground fuel storage tank
605	Tank from outside, south	1,024,000	Earthen	Diesel #2, in service	Aboveground fuel storage tank
841	Highbay 2	830	Metallic	Dielectric oil (Shell Diala Ax)	Electric transformer
862	Outside, east	10,000	Double-walled	Diesel #2	Underground fuel storage tank

Source: Fink, 2002.

Table 4-3. Other Storage Tanks at SNL/NM

Material	Capacity	Location
Argon, liquid	900 gal	NAPD[a]
	4,000 gal	NAPD
	500 gal	NAPD
	33,000 ft^3	NAPD
	900 gal	NAPD
Helium, liquid	9,420 lb	NAPD
Hydrochloric acid	6,500 gal	NAPD
Hydrogen, compressed gas	38,000 ft^3	NAPD
	96,000 ft^3	NAPD
	38,000 ft^3	NAPD
	38,000 ft^3	NAPD
Nitrogen (cryogenic liquid)	1,500 gal	NAPD
	11,000 gal	NAPD
	1,500 gal	NAPD
	1,500 gal	NAPD
	500 gal	NAPD
	6,000 gal	NAPD
	500 gal	NAPD
	11,000 gal	NAPD
	500 gal	NAPD
	300 gal	NAPD
	6,000 gal	NAPD
	1,500 gal	NAPD
	162,000 lb	NAPD
	4,400 gal	NAPD
	4,400 gal	NAPD
	1,500 gal	NAPD
	6,000 gal	NAPD
	13,000 gal	NAPD
	3,000 gal	NAPD
	1,500 gal	NAPD
	1,500 gal	NAPD
	1,500 gal	NAPD
	1,500 gal	NAPD
	1,500 gal	NAPD
	9,000 gal	NAPD
	11,000 gal	NAPD
	6,000 gal	NAPD
	6,000 gal	NAPD
Propane	1,000 gal	NAPD
	1,000 gal	NAPD
	1,000 gal	NAPD
	1,000 gal	NAPD
	500 gal	NAPD
	18,000 gal	NAPD

[a]Not Available for Public Distribution.
Source: Fink, 2002.

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CHAPTER 5.0
FY2001 NOTABLE FACILITIES OPERATIONS

CONTENTS

TABLES

Photovoltaic Systems Evaluation Laboratory West

National Solar Thermal Test Facility

Exterior Intrusion Detection and Assessment Test Field

5.0 FY2001 NOTABLE FACILITIES OPERATIONS

5.1 Introduction

In Chapter 4, major Fiscal Year (FY)2001 operations and activities at SNL/NM selected facilities were summarized and compared against the selected facility operations analyzed in the SNL/NM Site-Wide Environmental Impact Statement (SWEIS) (DOE, 1999). This chapter makes a similar comparison of information for 15 notable facilities located in three Technical Areas (TAs), the Coyote Test Field (CTF), and the Manzano Area of Kirtland Air Force Base (KAFB).

The information recorded here is compiled from personal communications and questionnaires submitted to facility managers or other facility staff. Descriptions of facilities come from safety documentation or facility representative information and have been refined as changes occurred.

5.2 TA-I Notable Facilities

5.2.1 Ion Beam Materials Research Laboratory

The Ion Beam Materials Research Laboratory is a low-hazard, nonnuclear facility built on a concrete slab with structural steel framing, stucco exterior, and a corrugated metal roof.

The Ion Beam Materials Research Laboratory houses several supporting laboratories, including the Ion Implantation Physics Lab, the Electron Cyclotron Resonance Lab, the Ion Implantation and Ion Beam Analysis Lab, the Double Crystal Diffractometry Lab, and the Materials Modification Lab. Major equipment in the facility includes two Van de Graaff accelerators and a 400-kilovolt (kV) ion implanter. The 6 mega-electron volt (MeV) Tandem Van de Graaff generator is part of the facility's equipment.

(Kuzio, 2001)

<u>Current Operations and Capabilities</u>

The Ion Beam Materials Research Laboratory performs basic and applied research, provides advanced ion beam capabilities, and is used to establish theories and validate models in materials science, solid-state physics, and accelerator physics. The work of the Ion Beam Materials Research Laboratory supports research and development for Defense Programs, Energy and Environment Programs, and work for others through laboratory-directed research and development and cooperative research and development agreements.

<u>Summary of Ion Beam Materials Research Laboratory Operations in FY2001</u>

During FY2001, operational levels at the Ion Beam Materials Research Laboratory were consistent with activities performed in FY2000 and with operational levels analyzed in the SWEIS. SNL/NM made no major additions or modifications to the facility in FY2001. No new capabilities were introduced in FY2001, and the hazards and hazard controls remained typical of laboratory and industrial environments.

(SNL, 2002i)

5.2.2 Sandia Lightning Simulator

The Sandia Lightning Simulator, a low-hazard, nonnuclear facility, is a prefabricated, single-floor, reinforced concrete structure with a basement. The facility is divided into office space and a highbay laboratory with a screen room, laser room, pump room, and machine shop. The highbay houses four Marx generators contained in two 30,000-gallon (gal) tanks (two Marx banks per tank).

(Kuzio, 2001)

Current Operations and Capabilities

When in operation, the Sandia Lightning Simulator generates simulated lightning to test nuclear weapon designs and safety-critical components for conformance to nuclear safety requirements. Other duties include supporting studies of the interaction of lightning with materials and structures, and testing electronic components, military missiles, aircraft, and communications equipment.

Summary of Sandia Lightning Simulator Operations in FY2001

During FY2001, SNL/NM maintained the operational capability of the Sandia Lightning Simulator, although the facility has been in mothball status since 1996. Current plans call for the facility to be refurbished during FY2002 to support weapons validation tests scheduled to start in FY2003 as part of the Stockpile Life Extension Program. No major additions or modifications to the facility occurred during FY2001, nor were any new capabilities introduced during the same period. Hazards and hazard controls remained typical of laboratory and industrial environments.

(SNL, 2002i)

5.2.3 Energy and Environment Building

The Energy and Environment Building, a low-hazard, nonnuclear facility, is a four-story building that includes 434 offices and 52 laboratory areas supporting energy-related and material science research programs.

(Kuzio, 2001)

Current Operations and Capabilities

Operations in the Energy and Environment Building include research, development, and testing of scientifically tailored materials, catalysts, processes, and devices. Areas of research and testing include geophysics, electronics, water quality, and various fields of chemistry.

Summary of Energy and Environment Building Operations in FY2001

During FY2001, operational levels at the Energy and Environment Building were consistent with FY2000 operations and the impact assessed in the SWEIS. SNL/NM constructed no major additions or modifications to the facility in the same period. No new capabilities were introduced, and the hazards and hazard controls remained typical of laboratory and industrial environments.

(SNL, 2002i)

5.2.4 Compound Semiconductor Research Lab (CSRL)

The CSRL, a low-hazard, nonnuclear facility, is a single-story building with an equipment penthouse. Current plans call for incorporating the existing capabilities of the CSRL with the Microelectronics Development Laboratory (MDL) into the proposed new Microsystems and Engineering Science Applications (MESA) Complex. MESA is proposed to begin development sometime in the FY2001-FY2003 timeframe. Additional discussion on the MESA Complex is included in Chapter 3.0.

(Kuzio, 2001)

Current Operations and Capabilities

The CSRL supports the investigation of the physics of compound semiconductors and device structures. The facility also supports fabrication of optoelectronic and digital compound semiconductor devices for both research and prototyping purposes. Specific activities at the CSRL include research and development of microelectronic devices for nuclear weapon applications, fabrication of microelectronic and photonic devices based on compound semiconductors, and study and refinement of techniques for processing compound semiconductors. Other activities include development of new processes and prototypes, fabrication of new, artificially structured materials through advanced growth or processing techniques, and fabrication of microchannels, integrated micro-optics, and other sensors.

Summary of CSRL Operations in FY2001

During FY2001, operational levels at the CSRL were consistent with FY2000 operations and with impacts analyzed in the SWEIS. SNL/NM constructed no major additions or modifications or added major new capacity to the facility, and the hazards and hazard controls remained typical of laboratory and industrial environments.

(SNL, 2002i)

5.2.5 Power Sources Development Laboratory

The Power Sources Development Laboratory is a two-story building with a mezzanine. It contains eight laboratories and one chemical storage building, including the Lithium Ambient Battery Fabrication Laboratory, the Materials Processing Laboratory, the Thermal Battery Test Laboratory, the Electrochemical Research Laboratory, the Thermal Battery Research Laboratory, the Ambient Battery Test Laboratory, the Chemical Laboratory, and the Microscopy Laboratory.

Current Operations and Capabilities

The Power Sources Development Laboratory supports research and development in the design and prototyping of thermal and lithium batteries. Within the facility, the Thermal Battery Test Laboratory is used to fabricate and test thermal battery cells and modules. Other work includes synthesis of inorganic compounds, testing the sensitivity of heat pellets with a portable laser, and development of new processes, prototypes, and energy storage systems.

Summary of Power Sources Development Laboratory Operations in FY2001

During FY2001, operational levels at the Power Sources Development Laboratory were consistent with FY2000 operations, and the impacts analyzed in the SWEIS. SNL/NM constructed no major additions or modifications to the facility in FY2001. No new capabilities were introduced, and the hazards and hazard controls remained typical of laboratory and industrial environments.

(SNL, 2002i)

5.2.6 Photovoltaic Systems Evaluation Laboratory West

The Photovoltaic Systems Evaluation Laboratory West is a single-story building made up of light electrical and mechanical labs. The facility includes photovoltaic arrays that are located between F Street and the NCO Bypass.

Current Operations and Capabilities

The Photovoltaic Systems Evaluation Laboratory West is a multipurpose research and testing laboratory that supports the DOE Conservation and Renewable Energy National Photovoltaics Program. Photovoltaic arrays tested at the Photovoltaic Systems Evaluation Laboratory West convert solar energy to direct current electricity to demonstrate and evaluate commercially available systems.

Researchers at the Photovoltaic Systems Evaluation Laboratory West develop new processes and perform evaluations, perform indoor and outdoor testing on photovoltaic cells, modules, arrays, and systems, and use batteries and diesel generators in hybrid system testing.

Summary of Photovoltaic Systems Evaluation Laboratory West Operations in FY2001

During FY2001, operational levels at the Photovoltaic Systems Evaluation Laboratory West were consistent with FY2000 operations and within the impacts analyzed in the SWEIS. SNL/NM constructed no major additions or modifications to the facility. No new capabilities were introduced, and hazards and hazard controls remained typical of laboratory and industrial environments.

(SNL, 2002i)

5.3 TA-III Notable Facilities

5.3.1 Radiant Heat Facility

The Radiant Heat Facility is a low-hazard, nonnuclear facility with six lab areas, and includes an adjacent concrete bunker and a large array of electrically powered heat lamps.

Current Operations and Capabilities

The Radiant Heat Facility provides the capability to study or prove the ability of a test item, such as a satellite component or a transportation container (e.g., radioactive material packaging), to withstand an accident involving a fire. Test items are exposed to a large array of electrically powered heat lamps that create a high-temperature heat environment similar to that of transportation accident fires. Other activities at the Radiant Heat Facility include environmental, safety, and survivability testing for nuclear weapon applications, small-scale testing to support reactor vessel annealing research, and model validation of thermally driven transport through foam encapsulants, to assess nuclear weapon response in abnormal environments.

Summary of Radiant Heat Facility Operations in FY2001

During FY2001, operational levels at the Radiant Heat Facility were consistent with FY2000 operations and impacts analyzed in the SWEIS. SNL/NM introduced no new capabilities in the same time period, and hazards and hazard controls remained typical of laboratory and industrial environments.

(SNL, 2002i)

5.3.2 Liquid Metal Processing Laboratory (LMPL)

The LMPL, a low-hazard, nonnuclear facility, is a one-story building with a highbay and attached office building. The facility operations involve nine specialized furnaces and a chemical etching operation. Each of these operations provides metal and metal-alloy melting or ceramic casting capabilities. The operations are highly specialized and provide support in research, development, and production for weapons research.

(Kuzio, 2001)

Current Operations and Capabilities

Specific activities in the Liquid Metal Processing Laboratory include environmental, safety, and survivability testing for nuclear weapon applications and development of metallurgical processing techniques to fabricate weapon components. Other activities include evaluation of material samples provided by Former Soviet Union (FSU) researchers, and materials research and development.

Summary of Liquid Metal Processing Laboratory Operations in FY2001

During FY2001, operational levels at the Liquid Metal Processing Laboratory were consistent with FY2000 operations and environmental impacts analyzed in the SWEIS. SNL/NM constructed no major additions or modifications to the facility in the same time period. No new capabilities were introduced, and hazards and hazard controls remained typical of standard laboratory and industrial environments. Budgets for the LMPL have been decreasing through FY2000 and FY2001; however, it is expected that the budget could increase by 25 percent in FY2002, with an additional 25 percent in

FY2003. This potential increase in funding would result in an increase in activities and experimentation at the LMPL; however, it is not expected that the LMPL would exceed the expanded operations analysis of the SWEIS.

(SNL, 2002i)

5.3.3 Classified Destruction Facility

The Classified Destruction Facility houses equipment necessary to perform its information destruction function, including the Hammermill and Micro DoD (Department of Defense) shredder.

Current Operations and Capabilities

During operation, the Hammermill conveyor feeds classified wastepaper into the document destructor, converting the paper to a residue that travels through the duct system to the cyclone separator, which includes a bag system. Compacted residue is transferred to a dumpster. The Micro DoD shredder is used to destroy classified film and plastics; the waste residue goes to a container. When the film to be destroyed contains silver, the residue is segregated for appropriate recycling and disposal.

The Hammermill can process up to 700 pounds (315 kilograms) of paper per hour. The Hammermill and Micro DoD shredder normally operate 4 hours per day, 3 days per week, 50 weeks per year.

Summary of Classified Destruction Facility Operations in FY2001

During FY2001, operational levels at the Classified Destruction Facility were consistent with FY2000 operations and environmental impacts analyzed in the SWEIS. SNL/NM constructed no major additions or modifications to the facility. No new capabilities were introduced, and hazards and hazard controls remained typical of standard laboratory and industrial environments.

(SNL, 2002i)

5.3.4 Vibration/Acoustic Complex

The Vibration/Acoustic Complex includes a single-floor, metal building with a basement that contains electrodynamic exciters, electrohydraulic exciters, electropneumatic acoustic drivers, and several arrays of electrodynamic acoustic drivers. Associated equipment at the facility includes a 180-kVA power amplifier, a 3,000-pounds-per-square-inch (psi) hydraulic power supply, and an 11,000-gal nitrogen storage tank and vaporizer. The Complex also includes single-story concrete buildings that contain electrodynamic power amplifiers with all associated power supplies and instrumentation, a vault-type room, and a main control room, respectively.

(Kuzio, 2001)

Current Operations and Capabilities

SNL/NM researchers use the Vibration/Acoustic Complex to conduct vibration, shock, and acoustic simulations for components and systems from small electronic packages to full-sized weapons components. These simulations provide information on how items respond to controlled vibration and acoustic stimuli. The information is used to define failure levels, to prove system integrity, to determine modes of vibration, and to verify theoretical computer models.

Summary of Vibration/Acoustic Complex Operations in FY2001

During FY2001, operational levels at the Vibration/Acoustic Complex were consistent with FY2000 operations and environmental impacts analyzed in the SWEIS. SNL/NM constructed no major additions or modifications to the facility during this time period. No new capabilities were introduced. Hazards and hazard controls remained typical of standard laboratory and industrial environments.

(SNL, 2002i)

5.4 TA-IV Notable Facilities

5.4.1 High Power Microwave Laboratory

The High Power Microwave Laboratory is a multifloor facility with basement and includes two data-acquisition screen rooms, the microwave control/monitor systems, a light laboratory, an attached anechoic chamber, and a large experimental cell that contains the Intermediate Pulser (IMP), the Cathode Test Bed (CTB), and the General Repetitive Universal Multi-Purpose (GRUMP) Pulser.

(Kuzio, 2001)

Current Operations and Capabilities

The High Power Microwave Laboratory provides a large, high-quality, electromagnetic test facility supporting DOE and U.S. Air Force (USAF) vulnerability and susceptibility testing requirements. Experiments in the High Power Microwave Laboratory involve the production of microwave energy by various sources (pulsed-power accelerators).

Currently, the IMP is a single-shot accelerator capable of five shots per day that produce bremsstrahlung radiation. The CTB is a single-shot microwave accelerator capable of repetitive pulsed operations that produce x-rays as an intermediate step in testing cathode materials. The GRUMP Pulser is a CTB used to develop and test different types of cathode materials and configurations.

Summary of High Power Microwave Laboratory Operations in FY2001

During FY2001, operational levels at the High Power Microwave Laboratory were consistent with FY2000 operations and the environmental impacts analyzed in the SWEIS. SNL/NM constructed no major facility additions during FY2001. No new capabilities were introduced. Hazards and hazard controls remained typical of standard laboratory and industrial environments.

(SNL, 2002i)

5.4.2 Proto II

The Proto II is an eight-module, radially converging, pulsed x-ray simulator. The accelerator is located in a multifloor building with a basement. This building contains 22 offices, several shops and storage areas, and 22 lab areas.

Current Operations and Capabilities

During FY2001, the Proto II remained nonoperational, with all fluids drained and energy sources locked out. Proto II was originally designed and constructed as a prototype for driving inertially confined fusion targets. In 1986, it was converted into an x-ray simulator. Currently, there are no plans to bring this accelerator back into operation.

Summary of Proto II Operations in FY2001

The Proto II did not operate in FY2001. SNL/NM added no major additions or modifications to the facility during FY2001.

(SNL, 2002i)

5.5 Coyote Test Field and Manzano Area

5.5.1 Manzano Storage Facility

The Manzano bunkers, located in the southeast portion of KAFB, were constructed by the DoD in the 1940s; they are owned by the USAF.

(SNL, 2002i)

The Manzano Storage Facility is comprised of reinforced concrete bunkers tunneled into the sides of a mountain. Most of the bunkers have a set of double-steel doors, a breezeway, and a second set of double doors into the main chamber.

(SNL, 1997b)

Current Operations and Capabilities

During FY2001, DOE leased 13 bunkers from the USAF for SNL/NM to manage and store *Resource Conservation and Recovery Act (RCRA)* mixed waste, low-level radioactive waste, and transuranic waste. The Manzano bunkers, listed on a RCRA Part A permit application, are operating under RCRA interim status, and are required to comply with RCRA regulations for hazardous and mixed waste storage. Periodically, waste management personnel inspect, handle, and move containers at the facility and may open the outer containers of multiple-container packages; however, the inner containers of packages are not opened at the facility, and no process operations are performed there.

Typical waste stored in the bunkers includes tritium-contaminated equipment and cleanup material, and experimental test units. The bunkers can also store restricted-access waste (classified information, high radioactivity levels, or other criteria) as approved by waste management personnel.

Summary of Manzano Storage Facility Operations in FY2001

During FY2001, operations at the Manzano Storage Facility were consistent with FY2000 operations and impacts analyzed in the SWEIS. SNL/NM made no major additions or modifications to the facility during FY2001. No new capabilities were introduced, and hazards and hazard controls remained typical of laboratory and industrial environments.

(SNL, 2002i)

5.5.2 National Solar Thermal Test Facility

The National Solar Thermal Test Facility (situated within CTF) is an area of ~115 ac (46.5 ha) that includes solar furnaces, parabolic dishes, parabolic troughs, and a field of 218 computer-controlled heliostats which reflect concentrated solar energy onto a 200-ft (61-m) tower. The complex includes a multi-story support building with a basement.

(Kuzio, 2001)

Current Operations and Capabilities

Test operations at the National Solar Thermal Test Facility provide research in high temperature and high thermal flux for solar applications, investigation of the thermophysical properties of materials, measurement of the thermal performance of components, systems, and materials, measurement of the effects of aerodynamic heating on radar transmission, and related investigations. The facility also provides large-scale optics for astronomical observations and atmospheric sounding.

Summary of National Solar Thermal Test Facility Operations in FY2001

During FY2001, operational levels at the National Solar Thermal Test Facility were consistent with FY2000 operations and the impacts analyzed in the SWEIS. SNL/NM constructed no major additions or modifications to the facility in FY2001. No new capabilities were introduced, and hazards and hazard controls remained typical of standard laboratory and industrial environments.

(SNL, 2002i)

5.5.3 Exterior Intrusion Detection and Assessment Test Field

The Exterior Intrusion Detection and Assessment Test Field facility includes several mobile offices, support trailers, a parking lot, and a sensor test area.

Current Operations and Capabilities

The Exterior Intrusion Detection and Assessment Test Field provides a capability to test various intrusion detection sensors for use by DOE, DoD, and the private sector. Routine operations at the Exterior Intrusion Detection and Assessment Test Field include tests and evaluations of equipment and techniques for intrusion detection and field modifications to meet test specifications.

Summary of Exterior Sensor Field Operations in FY2001

During FY2001, operational levels at the Exterior Intrusion Detection and Assessment Test Field were consistent with FY2000 operations and environmental impacts analyzed in the SWEIS. SNL/NM constructed no major additions or modifications to the facility during FY2001. Hazards and hazard controls remained typical of standard laboratory and industrial environments.

(SNL, 2002i)

5.5.4 Other Notable Facilities in Permitted Areas

Table 5-1 lists other notable SNL/NM facilities included in the SWEIS analysis of SNL/NM facilities and operations. The facilities are located on land permitted from the USAF.

Table 5-1. Other Facilities on Land Permitted from the U.S. Air Force*

Facility Name	Facility Location
Salvage Reapplication Yard	West of Technical Area IV
Explosives Storage Igloos	
Explosives Machining Test Facility Complex	Coyote Test Field
Explosive Test Facility	
Vat Tank Facility Complex	
Shock Thermodynamics Applied Research Facility	
Coyote Canyon Headquarters	
Large Melt Facility Complex (remained inactive during FY2001)	
Antenna Measurement Facility	
Earth Strain Meter Facility	
Electro Explosive Research Facility	
Radar Cross Section Measurement Facility	
Autonomous Land Vehicle Test Area (now includes some outdoor testing)	
Video Technology Lab	
Site-Deployable Seismic Verification System	
Manzano Saddle Radio Site	Manzano Area

* The level and scope of operations at these facilities is defined by the operations descriptions in the land use permit and supporting documents, e.g., Air Force Form 813 (environmental checklists), Air Force environmental assessments, and environmental baseline surveys. Any proposed major change in operations must be documented and approved by both DOE and the Air Force.
Source: SNL, 1999a.

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CHAPTER 6.0
REFERENCES

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40 CFR 264, *Standards for Owners and Operators of Hazardous Waste Treatment Storage and Disposal Facilties.*

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Native American Graves Protection and Repatriation Act of 1990 (NAGPRA), 25 U.S.C. § 3001 et seq.

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Resource Conservation and Recovery Act of 1976 (RCRA), 42 U.S.C. § 6901 et seq.

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APPENDIX A
SUMMARY OF ACTIVITIES AT
SNL/NM INDIVIDUAL LABORATORIES

CONTENTS

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A.1 Introduction

This appendix provides updated information on the activities of individual, general, special, and highbay laboratories at SNL/NM, including laboratories in facilities designated as "Notable Facilities" and "Selected Facilities" in the Site-Wide Environmental Impact Statement (SWEIS) (DOE, 1999).

The information compiled in this appendix was obtained from the Primary Hazard Screening (PHS) program, an element of SNL/NM's Integrated Safety Management System (ISMS), and from existing, unclassified, SNL/NM facility databases and information resources. It represents SNL/NM laboratories that have prepared PHSs since publication of the SNL/NM Facilities and Safety Information Document in 1999 (SNL, 1999). The PHS program provides a documented output of a hazards analysis process, in which one or more qualified individuals familiar with an operation identifies the hazards, the major requirements for hazard controls, and the laboratory's or operation's hazard category.

All the laboratories included in this appendix are categorized as having either standard industrial hazards (SIH) or low (nonnuclear) hazards (Low/NN). These categories apply to the activities taking place in the laboratories located within each of the buildings identified and represent the lowest hazard categories at SNL/NM. For security reasons, the appendix does not include information about laboratories in classified buildings or areas. For the same reason, some PHS titles have been retitled.

Item No.	PHS Name and No. (Date Completed)	Haz. Class and Type*	Representative Programs	Representative Activities	Recent NEPA Reviews
Tech Area I: Processing and Environmental Technology Laboratory (PETL)					
1	MPS-Gas Chromatograph Laboratory PHS No. SNL0A00384-001 (10/02/00)	Low/NN (COTM, E, H, P, R, T)	• Defense Programs • Work for Others	This lab supports SNL/NM with analyses on solids, liquids, head space, and gas mixtures from various engineering and research activities.	DOE/EA-0945, PETL EA
2	MPS-Analytical Preparation Laboratory PHS No. SNL0A00385-001 (11/14/00)	Low (COTM, E, H, P, T)	• Defense Programs • Work for Others	This lab supports SNL/NM with sample preparation and general analytical chemistry on solids and liquids from various engineering and research activities.	DOE/EA-0945, PETL EA
3	MPS-Liquid Chromatograph Laboratory PHS No. SNL0A00387-001 (10/05/00)	Low/NN (COTM, E, EN, H, P, T)	• Defense Programs • Work for Others	This lab supports SNL/NM with sample preparation and analysis of solids, liquids, and gases from various engineering and research activities.	DOE/EA-0945, PETL EA
4	MPS-Analytical Instrumentation Laboratory PHS No. SNL0A00388-001 (11/14/00)	Low/NN (COTM, E, H, L, NR, P, RF)	• Defense Programs • Work for Others	This lab supports SNL/NM with sample analysis on solids and liquids from various engineering and research activities.	DOE/EA-0945, PETL EA
5	MPS-Materials Development Laboratory PHS No. SNL0A00425-001 (10/18/00)	SIH	A wide variety of SNL/NM program work is classified as standard industrial hazards (SIH).	SIH activities are consistent with operational hazards in general industrial settings and adequately controlled by OSHA regulations.	DOE/EA-0945, PETL EA
6	MPS-Hybrid Organic-Inorganic Materials Laboratory PHS No. SNL0A00426-002 (10/05/00)	SIH	A wide variety of SNL/NM program work is classified as standard industrial hazards (SIH).	SIH activities are consistent with operational hazards in general industrial settings and adequately controlled by OSHA regulations.	DOE/EA-0945, PETL EA

***Key to Hazard Class and Type:** **B** - Biohazard; **COTM** - Use of chemicals or toxic materials; **E** - Electrical; **EN** - Environmental (e.g., air, discharge, hazardous or radioactive waste); **EX** - Explosives; **H** - High voltage pulsed power circuits; **K** - Equipment or machines that could generate kinetic energy; **L** - Use of lasers; **Low/NN** - Low Nonnuclear; **M** - Mechanical; **N** - Noise; **NCA** - Not commercially available equipment; **NR** - Nonionizing radiation; **P** - Pressure; **R** - Radiation; **RF** - Microwave/RF energy sources; **RGD** - Radiation-generating devices; **SIH** - Standard industrial hazard; **T** - Thermal; **THM** - Transportation of hazardous material.

Item No.	PHS Name and No. (Date Completed)	Haz. Class and Type*	Representative Programs	Representative Activities	Recent NEPA Reviews
Tech Area I: Processing and Environmental Technology Laboratory (PETL) (Continued)					
7	MPS-Hybrid Organic-Inorganic Materials Laboratory PHS No. SNL9A00048-004 (11/20/00)	Low/NN (COTM, E, H)	• Defense Programs • Work for Others	This lab's capabilities include synthesizing monomers, polymers and materials, developing new membranes, and conducting basic chemical operations.	DOE/EA-0945, PETL EA
8	MPS-Jamison PETL Laboratory PHS No. SNL9A00053-005 (12/04/00)	Low/NN (COTM, E, H)	• Defense Programs • Work for Others	This lab's capabilities include synthesizing monomers, polymers and materials, and conducting basic chemical operations.	DOE/EA-0945, PETL EA
9	MPS-Thermal Processing Lab PHS No. SNL0A00391-004 (10/10/00)	Low/NN (COTM, T)	• Defense Programs • Work for Others	This lab provides thermal processing of ceramic materials and supports SNL/NM with sample preparation.	DOE/EA-0945, PETL EA
10	MPS-Sample Preparation and Microscopy Lab PHS No. SNL0A00392-001 (10/08/00)	Low/NN (COTM, E, H)	• Defense Programs • Work for Others	This lab provides sample preparation of specimens for microscopy.	DOE/EA-0945, PETL EA
11	MPS-Encapsulants and Foam Development Laboratory PHS No. SNL0A00400-001 (10/09/00)	Low/NN (COTM, E, H, P, T)	• Defense Programs • Work for Others	This lab supports SNL/NM with sample analysis on encapsulants and foams from various engineering and research activities.	DOE/EA-0945, PETL EA
12	MPS-Mass Spectrometry Laboratory PHS No. SNL0A00403-001 (11/17/00)	Low/NN (COTM, E, H, P)	• Defense Programs • Work for Others	This lab supports SNL/NM with analyses on solids, liquids, and gas mixtures from various disciplines.	DOE/EA-0945, PETL EA

***Key to Hazard Class and Type: B** - Biohazard; **COTM** - Use of chemicals or toxic materials; **E** - Electrical; **EN** - Environmental (e.g., air, discharge, hazardous or radioactive waste); **EX** - Explosives; **H** - High voltage pulsed power circuits; **K** - Equipment or machines that could generate kinetic energy; **L** - Use of lasers; **Low/NN** - Low Nonnuclear; **M** - Mechanical; **N** - Noise; **NCA** - Not commercially available equipment; **NR** - Nonionizing radiation; **P** - Pressure; **R** - Radiation; **RF** - Microwave/RF energy sources; **RGD** - Radiation-generating devices; **SIH** - Standard industrial hazard; **T** - Thermal; **THM** - Transportation of hazardous material.

Item No.	PHS Name and No. (Date Completed)	Haz. Class and Type*	Representative Programs	Representative Activities	Recent NEPA Reviews
Tech Area I: Processing and Environmental Technology Laboratory (PETL) (Continued)					
13	MPS-Focused Ion Beam/Scanning Electron Microscope Lab PHS No. SNL0A00404-001 (09/26/00)	Low/NN (E, H, NR, RGD)	• Defense Programs • Work for Others	This lab provides SNL/NM with the dual-beam Focused Ion Beam/Scanning Electron Microscope (FIB/SEM) capability for materials characterization. This laboratory is used to prepare samples for FIB/SEM examination and to perform the actual FIB/SEM analyses on various materials.	DOE/EA-0945, PETL EA
14	MPS-Welding Process Laboratory PHS No. SNL0A00405-001 (09/19/00)	Low/NN (COTM, E, H, P, T)	• Defense Programs • Work for Others	This lab provides SNL/NM with the capability to conduct welding process materials research and development.	DOE/EA-0945, PETL EA
15	MPS-NMR Lab PHS No. SNL0A00430-002 (12/04/00)	Low/NN (E, H, RF)	• Defense Programs • Work for Others	This lab supports SNL/NM with analyses of both solid and solution samples.	DOE/EA-0945, PETL EA
16	MPS-Surface Preparation Laboratory PHS No. SNL0A00457-001 (12/06/00)	Low/NN (COTM, E, H, P, T)	• Defense Programs • Work for Others	This laboratory cleans and prepares samples for surface analysis in support of weapons development and internal research. Instrumentation in this laboratory is also used to perform surface profiles, surface photography, and measure surface adhesion.	DOE/EA-0945, PETL EA
17	MPS-TEM Lab PHS No. SNL0A00460-001 (11/14/00)	Low/NN (COTM, E, H, NR, RGD)	• Defense Programs • Work for Others	This laboratory supports SNL/NM with an electron microscope facility and an adjacent dark room.	DOE/EA-0945, PETL EA
18	MPS-Micro-systems Laser Process Laboratory PHS No. SNL0A00463-001 (12/04/00)	Low/NN (COTM, E, H, L, NR)	• Defense Programs • Work for Others	This lab provides SNL/NM with the capability to research and develop welding process materials.	DOE/EA-0945, PETL EA

***Key to Hazard Class and Type:** **B** - Biohazard; **COTM** - Use of chemicals or toxic materials; **E** - Electrical; **EN** - Environmental (e.g., air, discharge, hazardous or radioactive waste); **EX** - Explosives; **H** - High voltage pulsed power circuits; **K** - Equipment or machines that could generate kinetic energy; **L** - Use of lasers; **Low/NN** - Low Nonnuclear; **M** - Mechanical; **N** - Noise; **NCA** - Not commercially available equipment; **NR** - Nonionizing radiation; **P** - Pressure; **R** - Radiation; **RF** - Microwave/RF energy sources; **RGD** - Radiation-generating devices; **SIH** - Standard industrial hazard; **T** - Thermal; **THM** - Transportation of hazardous material.

Item No.	PHS Name and No. (Date Completed)	Haz. Class and Type*	Representative Programs	Representative Activities	Recent NEPA Reviews
Tech Area I: Processing and Environmental Technology Laboratory (PETL) (Continued)					
19	MPS-Building 701 Laboratory PHS No. SNL0A00466-001 (03/20/00)	Low/NN (E, H, L, P, NR, T)	• Defense Programs • Work for Others	This lab provides SNL/NM with the capability to conduct material analysis with a laser and infrared spectroscopy.	DOE/EA-0945, PETL EA
20	MPS-Biosensor Development Lab PHS No. SNL0A00476-001 (11/10/00)	Low/NN (B, E, H, L, P, NR, T)	• Defense Programs • Work for Others	This lab provides SNL/NM with the capability to develop and characterize biological sensors for biological warfare agent detection and biomedical applications.	DOE/EA-0945, PETL EA
21	Advanced Packaging Laboratory PHS No. SNL1A00170-001 (06/18/01)	SIH	A wide variety of SNL/NM program work is classified as standard industrial hazards (SIH).	SIH activities are consistent with operational hazards in general industrial settings and adequately controlled by OSHA regulations.	DOE/EA-0945, PETL EA
22	MEMS Research Laboratory PHS No. SNL1A00037-001 (04/16/01)	SIH	A wide variety of SNL/NM program work is classified as standard industrial hazards (SIH).	This lab is used for the development of back-end MEMS processes and for testing of fluidic devices.	DOE/EA-0945, PETL EA
23	Microchem Laboratory PHS No. SNL1A00031-002 (4/04/01)	SIH	A wide variety of SNL/NM program work is classified as standard industrial hazards (SIH).	This lab provides SNL/NM with the capability to do light electronic testing (low power), soldering PC boards, and data acquisition with standard test equipment and computers.	DOE/EA-0945, PETL EA
24	Building 701 Laboratory PHS No. SNL0A00496-001 (11/30/00)	SIH	A wide variety of SNL/NM program work is classified as standard industrial hazards (SIH).	SIH activities are consistent with operational hazards in general industrial settings and adequately controlled by OSHA regulations.	DOE/EA-0945, PETL EA
25	Chemical Deprocessing and SEM Laboratory PHS No. SNL0A00503-001 (02/01/01)	SIH	A wide variety of SNL/NM program work is classified as standard industrial hazards (SIH).	SIH activities are consistent with operational hazards in general industrial settings and adequately controlled by OSHA regulations.	DOE/EA-0945, PETL EA

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Item No.	PHS Name and No. (Date Completed)	Haz. Class and Type*	Representative Programs	Representative Activities	Recent NEPA Reviews
Tech Area I: Research – Standards Labs and Offices					
26	MPS-Dew Point Laboratory PHS No. SNL9A00309-001 (11/17/99)	SIH	• Defense Programs • Work for Others	Equipment includes field portable gas analyzers for sampling gas from a container and simultaneously measuring the gas dew point.	ECL/ADM SNA 95-119, Laboratory Operations Materials and Process Sciences Center
27	MPS-Encapsulant Synthesis Laboratory PHS No. SNL9A00319-001 (11/19/99)	SIH	• Defense Programs • Work for Others	This lab is used for synthesis, formulation, and testing of encapsulants, including removable encapsulants and sticky foams.	ECL/ADM SNA 95-119, Laboratory Operations Materials and Process Sciences Center
28	Organic Materials Synthesis Lab PHS No. SNL9A00324-001 (11/22/99)	Low/NN (COTM, M)	A wide variety of SNL/NM program work is classified as standard industrial hazards (SIH).	SIH activities are consistent with operational hazards in general industrial settings and adequately controlled by OSHA regulations.	ECL/ADM SNA 95-119, Laboratory Operations Materials and Process Sciences Center
Tech Area I: Research and Development Labs and Offices					
29	Tflops Repair Facility (Light Electrical Lab) PHS No. SNL0A00437-002 (10/17/00)	SIH	A wide variety of SNL/NM program work is classified as standard industrial hazards (SIH).	The Intel Tflops Repair Facility is a light electrical lab. Activities involve the use of equipment necessary to determine, diagnose, and repair problems with the tflops power supplies and processor node boards.	DOE/EIS-0281-064, Tflops Repair Facility
Tech Area I: Energy and Environment Building (Systems Research and Development)					
30	Light/Computer Lab PHS No. SNL9A00276-002 (10/03/00)	SIH	A wide variety of SNL/NM program work is classified as standard industrial hazards (SIH).	SIH activities are consistent with operational hazards in general industrial settings and adequately controlled by OSHA regulations.	DOE/EIS-0281
31	Light Lab PHS No. SNL9A00277-001 (10/11/99)	SIH	A wide variety of SNL/NM program work is classified as standard industrial hazards (SIH).	SIH activities are consistent with operational hazards in general industrial settings and adequately controlled by OSHA regulations.	DOE/EIS-0281
32	Evaporation Control PHS No. SNL0A00297-001 (04/20/00)	SIH	A wide variety of SNL/NM program work is classified as standard industrial hazards (SIH).	SIH activities are consistent with operational hazards in general industrial settings and adequately controlled by OSHA regulations.	DOE/EIS-0281

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Item No.	PHS Name and No. (Date Completed)	Haz. Class and Type*	Representative Programs	Representative Activities	Recent NEPA Reviews
Tech Area I: Energy and Environment Building (Systems Research and Development) (Continued)					
33	Water Chemistry Lab PHS No. SNL9A00132-003 (08/23/00)	SIH	A wide variety of SNL/NM program work is classified as standard industrial hazards (SIH).	This lab activity includes determining the effects of the addition of small quantities of nontoxic chemicals to bodies of water on the rate of evaporation. The chemicals used are both commercially available and produced in small-scale biological reactors which utilize nonpathogenic, naturally-occurring bacteria and fungi.	DOE/EIS-0281
34	Light Lab PHS No. SNL9A00278-004 (08/08/00)	SIH	A wide variety of SNL/NM program work is classified as standard industrial hazards (SIH).	SIH activities are consistent with operational hazards in general industrial settings and adequately controlled by OSHA regulations.	DOE/EIS-0281
35	Bldg. 823 HARP PHS No. SNL9A00346-001 (12/06/99)	Low/NN (COTM, E, H, NR, RGD)	This PHS is a rollup of program information for Building 823.	This PHS is a rollup of information for Building 823.	DOE/EIS-0281
36	ECI X-Ray Diffraction Laboratory PHS No. SNL9A00296-002 (08/23/00)	Low/NN (COTM, E, H, R, RGD)	• Basic Energy Sciences • Critical infrastructure	This lab supports SNL/NM's catalysis work covering design and simulation, synthesis, characterization, testing and process control. The lab also supports the development of novel catalysts and catalytic processes, including nanocatalysts, biomimetic catalysts, chiral catalysts, fuel cell catalysts, and membrane reactors.	DOE/EIS-0281
Tech Area I: Medical Facility					
37	Diagnostic Radiography Laboratory PHS No. SNL1A00134-001 (04/16/01)	Low/NN (R, COTM)	• ES&H Activities	This lab is used by radiographic technologists to perform x-ray examinations, dark room procedures, documentation of x-ray procedures, and pulmonary function tests.	DOE/EIS-0281

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Item No.	PHS Name and No. (Date Completed)	Haz. Class and Type*	Representative Programs	Representative Activities	Recent NEPA Reviews
Tech Area I: Medical Facility (Continued)					
38	Decontamination Facility PHS No. SNL1A00156-001 (06/11/01)	Low/NN (R, COTM)	• ES&H Activities	This lab is used to decontaminate and treat radioactive and/or chemically contaminated employees.	DOE/EIS-0281
39	Clinical Laboratory PHS No. SNL1A00118-001 (04/16/01)	Low/NN (B, COTM)	• ES&H Activities	This lab is used by medical technologists for a variety of lab procedures.	DOE/EIS-0281
Tech Area I: Development Shops					
40	High Energy Density Welding/Precision Metal, Metal Preparation, Welding and CMI PHS No. SNL0A00361-001 (06/28/00)	SIH	A wide variety of SNL/NM program work is classified as standard industrial hazards (SIH).	SIH activities are consistent with operational hazards in general industrial settings and adequately controlled by OSHA regulations.	DOE/EA-1264, Rapid Reactivation Project EA
Tech Area I: CRM Office Building					
41	Neutron Generator Fabrication Wing PHS No. SNL0A00440-001 (10/13/00)	Low/NN (COTM, E, EX, H, R, RGD, T)	Defense Programs	Facility operations involve the manufacture of neutron generator (NG) subassembly components and the final assembly and test operations for NG components and assemblies.	DOE/EA-1264, Rapid Reactivation Project EA; DOE/EA-0879, Neutron Generator/Switch Tube Prototyping Relocation EA

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Tech Area I: CRM Office Building					
42	Neutron Generator Fabrication Wing PHS No. SNL9A00235-004 (04/19/01)	Low/NN (COTM, E, EX, H, R, RGD, T)	Defense Programs	Facility operations involve the manufacture of NG subassembly components and the final assembly and test operations for NG components and assemblies.	DOE/EA-1264, Rapid Reactivation Project EA; DOE/EA-0879, Neutron Generator/Switch Tube Prototyping Relocation EA
Tech Area I: Microelectronics Development Lab					
43	MDL Electrical Test PHS No. SNL9A00028-002 (06/20/00)	Low/NN (E)	Defense Programs	This lab provides both automatic and manual wafer electrical testing.	DOE/EIS-0281
44	Light Laboratory PHS No. SNL1A00221-001 (09/05/01)	SIH	A wide variety of SNL/NM program work is classified as standard industrial hazards (SIH).	Activities in this lab involve precision flip chip assembly and die placement.	DOE/EIS-0281
45	MDL MEMS Release and Dry Processing PHS No. SNL9A00331-001 (08/02/00)	Low/NN (COTM, P)	Defense Programs	Activities involve exposing fullsize wafers or wafer pieces to acids, oxidizers, bases, and solvents. Other activities involve drying, applying coatings to the parts within a glove box, using the super-critical carbon dioxide drying system, or a combination of these methods. Wet-etching trenches into silicon is also performed.	DOE/EIS-0281
46	MDL Electronic Lab (retitled) PHS No. SNL0A00351-001 (10/27/00)	SIH	A wide variety of SNL/NM program work is classified as standard industrial hazards (SIH).	This lab supports SNL/NM with process development and assembly of optoelectronic transceivers.	DOE/EIS-0281-058, Micro-Transmitter
47	Gamma Cell (retitled) PHS No. SNL0A00353-001 (10/27/00)	SIH	A wide variety of SNL/NM program work is classified as standard industrial hazards (SIH).	SIH activities are consistent with operational hazards in general industrial settings and adequately controlled by OSHA regulations.	ECL/ADM SNA 99-056-006, Gamma Cell

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Tech Area I: Aerothermodynamics Laboratory					
48	Small Scale Fire Experiments PHS No. SNL0A00270-002 (03/15/00)	SIH	A wide variety of SNL/NM program work is classified as standard industrial hazards (SIH).	SIH activities are consistent with operational hazards in general industrial settings and adequately controlled by OSHA regulations.	ECL/ADM SNA 0-032, Small Scale Fire Experiments
Tech Area I: Nuclear Material Transport and Storage Facility					
49	Microsystems Integration Characterization Lab (MICL) PHS No. SNL1A00151-001 (5/28/02)	Low/NN (E, COTM)	Defense Programs	This lab performs micro assembly and electronic testing.	SNA 02-0199
Tech Area I: Micro Electronics Labs and Offices (Neutron Generator Facility)					
50	Electronic Neutron Generator Assembly PHS No. SNL9A00242-002 (08/20/99)	Low/NN (COTM, E, EX, H, R, RGD, T)	Defense Programs	Facility operations involve the manufacture of NG subassembly components and the final assembly and test operations for NG components and assemblies.	DOE/EA-1264, Rapid Reactivation Project
Tech Area I: Radio Frequency Facility					
51	872 Highbay-Bonded Storage PHS No. SNL0A00043-001 (02/25/00)	SIH	A wide variety of SNL/NM program work is classified as standard industrial hazards (SIH).	SIH activities are consistent with operational hazards in general industrial settings and adequately controlled by OSHA regulations.	DOE/EA-1264-001, Relocation of Bonded Storage
Tech Area I: Independent Vulnerability Assessment Facility					
52	Light Electrical Lab PHS No. SNL0A00051-002 (04/06/00)	SIH	A wide variety of SNL/NM program work is classified as standard industrial hazards (SIH).	SIH activities are consistent with operational hazards in general industrial settings and adequately controlled by OSHA regulations.	DOE/EIS-0281-042, Research, Development, and Testing
53	Environmental VTR Test Lab PHS No. SNL0A00422-001 (09/25/00)	SIH	A wide variety of SNL/NM program work is classified as standard industrial hazards (SIH).	SIH activities are consistent with operational hazards in general industrial settings and adequately controlled by OSHA regulations.	DOE/EIS-0281-019, Automatic Target Recognition

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Tech Area I: Reclamation Warehouse and Office					
54	Seal Test Lab PHS No. SNL0A00365-001 (08/11/00)	SIH	A wide variety of SNL/NM program work is classified as standard industrial hazards (SIH).	Normal test activities include verifying seal performance, leak-testing seals and containers, and measuring the physical properties.	DOE/EIS-0281
Tech Area I: Instrumentation Systems Laboratory					
55	Light Electronics Laboratory PHS No. SNL0A00292-002 (04/21/00)	SIH	A wide variety of SNL/NM program work is classified as standard industrial hazards (SIH).	Activities at this light electronic lab include software development; development, assembly, and testing of custom electronics hardware; and small mechanical part assembly.	DOE/EIS-0281-042, Research, Development, and Testing
56	Hype-Spectral Laboratory PHS No. SNL1A00058-001 (04/13/01)	SIH	A wide variety of SNL/NM program work is classified as standard industrial hazards (SIH).	Activities at this lab include optical payload assembly, imaging spectrometry (laser and non-laser), and thin film mirror experiments.	DOE/EIS-0281-042, Research, Development, and Testing
57	Module Tester Laboratory PHS No. SNL1A00029-001 (4/06/01)	SIH	A wide variety of SNL/NM program work is classified as standard industrial hazards (SIH).	This lab is used to design, assemble, test, and repair prototype flight electronic equipment.	DOE/EIS-0281-042, Research, Development, and Testing
58	GPS Lens Test Laboratory PHS No. SNL1A00061-001 (04/13/01)	SIH	A wide variety of SNL/NM program work is classified as standard industrial hazards (SIH).	This lab is used primarily in optical testing of global positioning system (GPS) optical components, as well as a variety of satellite optics.	DOE/EIS-0281-042, Research, Development, and Testing
59	Light Mechanical Laboratory PHS No. SNL9A00211-002 (09/02/99)	SIH	Defense Programs	This lab is used to assemble, test, and repair prototype flight hardware.	DOE/EIS-0281-051, Fiber Optic Control Module
Tech Area I: Energy Technology Office and Building					
60	Ground Based SAR Applications Testbed PHS No. SNL9A00186-001 (08/02/99)	SIH	Defense Programs	SIH activities are consistent with operational hazards in general industrial settings and adequately controlled by OSHA regulations.	DOE/EIS-0281-055, SAR Equipment

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Tech Area I: Energy Technology Office and Building (Continued)					
61	Ground Based SAR Applications Testbed PHS No. SNL9A00187-001 (08/02/99)	SIH	Defense Programs	SIH activities are consistent with operational hazards in general industrial settings and adequately controlled by OSHA regulations.	DOE/EIS-0281-055, SAR Equipment
62	Sandia Ground Equipment (SAGE) Laboratory PHS No. SNL1A00150-001 (6/01/01)	SIH	A wide variety of SNL/NM program work is classified as standard industrial hazards (SIH).	SIH activities are consistent with operational hazards in general industrial settings and adequately controlled by OSHA regulations.	DOE/EIS-0281-055, SAR Equipment
63	Light Electronics Laboratory PHS No. SNL1A00173-001 (6/01/01)	Low/NN (E, COTM)	Defense Programs	This lab conducts work with digital and analog electronics.	DOE/EIS-0281-055, SAR Equipment
64	Ground Based SAR Applications Testbed PHS No. SNL9A00188-001 (08/02/99)	SIH	Defense Programs	SIH activities are consistent with operational hazards in general industrial settings and adequately controlled by OSHA regulations.	DOE/EIS-0281-055, SAR Equipment
65	Light Electrical Lab PHS No. SNL9A00283-002 (08/02/99)	Low/NN (E)	Defense Programs	The laboratory is used to design, assemble, test, and repair prototype flight electronic equipment.	DOE/EIS-0281-035, Predator UAV
66	Test Lab PHS No. SNL0A00359-001 (06/28/00)	SIH	A wide variety of SNL/NM program work is classified as standard industrial hazards (SIH).	This lab performs mechanical assembly and software testing.	DOE/EIS-0281-035, Predator UAV
67	Optoelectronics Lab PHS No. SNL0A00504-001 (12/20/00)	SIH	Defense Programs	This lab supports the characterization of optoelectronic equipment and components.	DOE/EIS-0281-035, Predator UAV

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Tech Area I: Compound Semiconductor Research Laboratory					
68	Staff Machine Shop PHS No. SNL0A00377-002 (08/24/01)	SIH	A wide variety of SNL/NM program work is classified as standard industrial hazards (SIH).	SIH activities are consistent with operational hazards in general industrial settings and adequately controlled by OSHA regulations.	DOE/EIS-0281-001, MicroSensor R&D ECL/ADM SNA 0-035, EmCore System
69	Material and Device Characterization Lab PHS No. SNL1A00213-002 (09/19/01)	SIH	A wide variety of SNL/NM program work is classified as standard industrial hazards (SIH).	SIH activities are consistent with operational hazards in general industrial settings and adequately controlled by OSHA regulations.	DOE/EIS-0281-001, MicroSensor R&D ECL/ADM SNA 0-035, EmCore System
70	CSRL PHS No. SNL0A00401-001 (12/20/00)	SIH	• Defense Programs • Nonproliferation and Material Control • Emerging Threats • Energy and Critical Infrastructure	SIH activities are consistent with operational hazards in general industrial settings and adequately controlled by OSHA regulations.	DOE/EIS-0281-001, MicroSensor R&D ECL/ADM SNA 0-035, EmCore System
Tech Area I: Mail Services, Inspection, & Power Development Lab					
71	Lithium/Ambient Cell/Battery Test Lab PHS No. SNL9A00356-002 (05/22/00)	Low/NN (COTM, E)	• Defense Programs • Basic Energy Sciences	This lab supports SNL/NM with testing of lithium ambient cell/batteries.	DOE/EIS-0281-025, Battery Development DOE/EIS-0281-046, Rechargeable Batteries
72	Lithium Ion Cell Materials PHS No. SNL0A00429-001 (10/12/00)	SIH	A wide variety of SNL/NM program work is classified as standard industrial hazards (SIH).	This lab manufactures materials for lithium ion cells.	DOE/EIS-0281-025, Battery Development DOE/EIS-0281-046, Rechargeable Batteries
73	Ultrasonic Testing PHS No. SNL0A00449-001 (10/17/00)	Low/NN (COTM, E, T)	Defense Programs	Several labs provide space for testing materials, joints, and subsystems for imperfections using eddy current, ultrasonics, and other techniques. Development and staging work is also done.	DOE/EIS-0281-025, Battery Development DOE/EIS-0281-046, Rechargeable Batteries

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Tech Area I: Robotics Manufacturing Science and Engineering Lab (RMSEL)					
74	Pilot Plant (retitled) PHS No. SNL0A00301-004 (05/01/00)	SIH	• Defense Programs • DOE Integrated Activities • LDRD • Work for Others	This lab performs research and development in robotics for disassembling conventional munitions (e.g., artillery shells).	DOE/EA-0885, RMSEL EA
75	Micro Robot Laboratory PHS No. SNL1A00219-001 (08/01/01)	SIH	A wide variety of SNL/NM program work is classified as standard industrial hazards (SIH).	This is a light electro-mechanical lab for the development of sensor technology and robotic systems.	DOE/EA-0885, RMSEL EA
76	Light Electrical Lab PHS No. SNL0A00061-002 (03/08/00)	SIH	A wide variety of SNL/NM program work is classified as standard industrial hazards (SIH).	SIH activities are consistent with operational hazards in general industrial settings and adequately controlled by OSHA regulations.	DOE/EA-0885, RMSEL EA
77	Light Electrical Lab PHS No. SNL0A00062-001 (01/21/01)	SIH	A wide variety of SNL/NM program work is classified as standard industrial hazards (SIH).	This is a light electrical lab for sensor development work. Activities include soldering and light fabrication.	DOE/EA-0885, RMSEL EA
78	Motion Lab (retitled) PHS No. SNL9A00284-002 (10/05/00)	Low/NN (K)	• LDRD • DOE Integrated Activities • Work for Others	This lab is a testbed for evaluation of certain prototype parts, which are tested to determine the bearing coefficient of friction and a universal joint assembly.	DOE/EA-0885, RMSEL EA
79	Dextrous Manipulator Laboratory PHS No. SNL0A00037-001 (2/21/00)	SIH	• DOE Integrated Activities • LDRD • Work for Others	This laboratory is used to develop dextrous manipulator applications for bomb disposal involving motor vehicles.	DOE/EA-0885, RMSEL EA
80	Light Electrical Sensors Lab PHS No. SNL0A00058-001 (2/21/00)	Low	A wide variety of SNL/NM program work is classified as standard industrial hazards (SIH).	SIH activities are consistent with operational hazards in general industrial settings and adequately controlled by OSHA regulations.	DOE/EA-0885, RMSEL EA
81	Mega-Lab Robotic Plasma Torch PHS No. SNL9A00108-001 (09/01/99)	SIH	A wide variety of SNL/NM program work is classified as standard industrial hazards (SIH).	SIH activities are consistent with operational hazards in general industrial settings and adequately controlled by OSHA regulations.	DOE/EA-0885, RMSEL EA

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Tech Area I: Robotics Manufacturing Science and Engineering Lab (RMSEL) (Continued)					
82	Robocal Lab PHS No. SNL9A00281-001 (11/15/99)	SIH	A wide variety of SNL/NM program work is classified as standard industrial hazards (SIH).	SIH activities are consistent with operational hazards in general industrial settings and adequately controlled by OSHA regulations.	DOE/EA-0885, RMSEL EA
83	Electrical Projects Lab PHS No. SNL0A00278-002 (04/03/00)	SIH	A wide variety of SNL/NM program work is classified as standard industrial hazards (SIH).	SIH activities are consistent with operational hazards in general industrial settings and adequately controlled by OSHA regulations.	DOE/EA-0885, RMSEL EA
84	Water Technology PHS No. SNL0A00005-001 (02/10/00)	SIH	A wide variety of SNL/NM program work is classified as standard industrial hazards (SIH).	SIH activities are consistent with operational hazards in general industrial settings and adequately controlled by OSHA regulations.	DOE/EA-0885, RMSEL EA
85	Department Projects (retitled) PHS No. SNL0A00041-002 (02/24/00)	SIH	A wide variety of SNL/NM program work is classified as standard industrial hazards (SIH).	SIH activities are consistent with operational hazards in general industrial settings and adequately controlled by OSHA regulations.	DOE/EA-0885, RMSEL EA
86	Glovebox Operations (retitled) PHS No. SNL9A00282-001 (11/19/99)	Low/NN (L, M, P, T)	• Work for Others • DOE Integrated Activities	Glovebox research and development operations are performed.	DOE/EA-0885, RMSEL EA
87	Networked Robots (retitled) PHS No. SNL0A00272-002 (03/27/00)	Low/NN (NCA)	• Integrated DOE Activities • Work for Others	Activities involve the use of robots or robotic systems, rapid prototyping and systems analysis, and development of sensors and sensor utilization software.	DOE/EA-0885, RMSEL EA
88	Sensor Laboratory (retitled) PHS No. SNL0A00058-001 (03/02/00)	SIH	A wide variety of SNL/NM program work is classified as standard industrial hazards (SIH).	SIH activities are consistent with operational hazards in general industrial settings and adequately controlled by OSHA regulations.	DOE/EA-0885, RMSEL EA
89	Sensors Project (retitled) PHS No. SNL0A00121-001 (03/15/00)	Low/NN (NCA)	Work for Others	Activities include development and use of robots or robotic systems.	DOE/EA-0885, RMSEL EA

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Item No.	PHS Name and No. (Date Completed)	Haz. Class and Type*	Representative Programs	Representative Activities	Recent NEPA Reviews
Tech Area I: Robotics Manufacturing Science and Engineering Lab (RMSEL) (Continued)					
90	Paradex System PHS No. SNL0A00409-001 (10/03/00)	SIH	A wide variety of SNL/NM program work is classified as standard industrial hazards (SIH).	SIH activities are consistent with operational hazards in general industrial settings and adequately controlled by OSHA regulations.	DOE/EA-0885, RMSEL EA
91	Paradex I System PHS No. SNL0A00410-001 (10/02/00)	SIH	A wide variety of SNL/NM program work is classified as standard industrial hazards (SIH).	SIH activities are consistent with operational hazards in general industrial settings and adequately controlled by OSHA regulations.	DOE/EA-0885, RMSEL EA
92	Paradex II System PHS No. SNL0A00406-001 (10/03/00)	SIH	A wide variety of SNL/NM program work is classified as standard industrial hazards (SIH).	SIH activities are consistent with operational hazards in general industrial settings and adequately controlled by OSHA regulations.	DOE/EA-0885, RMSEL EA
93	IEDD Lab PHS No. SNL0A00415-001 (09/05/00)	Low/NN (K)	• Integrated DOE Activities • Work for Others	This lab supports SNL/NM in mobile robotics that have been modified or developed to assist military agencies or civil police groups in bomb disposal and anti-terrorist activities.	DOE/EA-0885, RMSEL EA
Tech Area I: Integrated Materials Research Lab					
94	Sensor Laboratory PHS No. SNL1A00119-002 (08/24/01)	SIH	A wide variety of SNL/NM program work is classified as standard industrial hazards (SIH).	SIH activities are consistent with operational hazards in general industrial settings and adequately controlled by OSHA regulations.	DOE/EIS-0281
95	MPS Research Bay (retitled) PHS No. SNL9A00047-002 (06/01/00)	Low/NN (COTM, EN, M, P, T, THM)	Defense Programs	Studies include synthetic chemistry using organic and inorganic chemicals (solids, flammables, and nonflammables).	DOE/EIS-0281
96	Acoustic Wave Sensor R&D Lab PHS No. SNL1A00064-001 (08/29/01)	SIH	A wide variety of SNL/NM program work is classified as standard industrial hazards (SIH).	Work in this lab involves the development of prototype mechanical and electronic sensors.	DOE/EIS-0281

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Item No.	PHS Name and No. (Date Completed)	Haz. Class and Type*	Representative Programs	Representative Activities	Recent NEPA Reviews
Tech Area I: Integrated Materials Research Lab (Continued)					
97	MPS-Encapsulants Characterization Lab PHS No. SNL9A00057-002 (08/15/01)	Low/NN (E, COTM)	Defense Programs	This lab is used for the characterization and study of material properties such as polymer encapsulants.	DOE/EA-0885, RMSEL EA
98	Surface Analysis Lab PHS No. SNL0A00065-002 (10/30/00)	SIH	A wide variety of SNL/NM program work is classified as standard industrial hazards (SIH).	SIH activities are consistent with operational hazards in general industrial settings and adequately controlled by OSHA regulations.	DOE/EIS-0281
99	Laboratory PHS No. SNL9A00270-001 (06/01/00)	SIH	A wide variety of SNL/NM program work is classified as standard industrial hazards (SIH).	SIH activities are consistent with operational hazards in general industrial settings and adequately controlled by OSHA regulations.	DOE/EIS-0281
100	MPS-IFM PHS No. SNL0A00446-001 (10/17/00)	SIH	A wide variety of SNL/NM program work is classified as standard industrial hazards (SIH).	This lab performs research on interfacial force. Small samples of solid materials (typically 1 cc) of rubbers, metals, composites etc. are probed with a 1-micron-radius tip to generate force, creep and relaxation data on a sub-nanometer (dl) and micro-Newton (F) scale.	DOE/EIS-0281
Tech Area I: Explosive Components Facility					
101	Scanning Electron Microscope (SEM)/MET Lab (retitled) PHS No. 9713955763-004 (04/04/00)	Low/NN (E, EN, EX, M, P, RGD, T)	• Defense Programs • Work for Others	Features include the SEM and metallographic preparation lab.	DOE/EA-1264, Rapid Reactivation Project Environmental Assessment DOE/EIS-0281
102	GC/MS Lab PHS No. 9713952727-004 (03/07/00)	Low/NN (E, EN, EX, M, P, T)	• Defense Programs • Work for Others	This lab contains a gas chromatograph/mass spectrometer.	DOE/EIS-0281 DOE/EA-1264, Rapid Reactivation Project Environmental Assessment
103	Characterization Lab (retitled) PHS No. 9713949631-004 (03/29/00)	Low/NN (E, EN, EX, P, R, T)	• Defense Programs • Work for Others	This is an explosives characterization lab; activities generate hazardous waste.	DOE/EIS-0281 DOE/EA-1264, Rapid Reactivation Project Environmental Assessment

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Item No.	PHS Name and No. (Date Completed)	Haz. Class and Type*	Representative Programs	Representative Activities	Recent NEPA Reviews
Tech Area I: Explosive Components Facility (Continued)					**100,308 gross square feet/41,495 square feet of lab space**
104	Dynamics Lab (retitled) PHS No. 9714152886-004 (03/22/00)	Low/NN (B, E, EN, EX, M, NCA, P, T, THM)	• Defense Programs • Work for Others	Research involves material dynamics.	DOE/EIS-0281 DOE/EA-1264, Rapid Reactivation Project Environmental Assessment
105	Component Testing (retitled) PHS No. 972033649-004 (05/03/00)	Low/NN (E, EN, EX, L, N, NCA, P, THM)	• Defense Programs • Work for Others	Activities include component testing and equipment development.	DOE/EIS-0281 DOE/EA-1264, Rapid Reactivation Project Environmental Assessment
106	Thermal Testing Lab (retitled) PHS No. 9714151446-004 (04/26/00)	Low/NN (CR, E, EN, EX, L, M, P, T, THM)	• Defense Programs • Work for Others	Activities include optical diagnostic work.	DOE/EIS-0281 DOE/EA-1264, Rapid Reactivation Project Environmental Assessment
107	Hydrocompactor (retitled) PHS No. 9715656626-004 (05/03/00)	Low/NN (COTM, E, EN, EX, M, N, P, THM)	• Defense Programs • Work for Others	Activities include materials research and development.	DOE/EIS-0281 DOE/EA-1264, Rapid Reactivation Project Environmental Assessment
108	Production Test Lab PHS No. SNL9A00320-003 (03/21/00)	Low/NN (COTM, E, EX, L, M, P)	• Defense Programs • Work for Others	This is a production test lab.	DOE/EIS-0281 DOE/EA-1264, Rapid Reactivation Project Environmental Assessment
Tech Area I: Microsystems and Engineering Sciences Applications (MESA) Complex					
109	Microfab (retitled) PHS No. SNL0A00016-001 (01/20/00)	Moderate (COTM, M, P)	Defense Programs	The Microfab provides a cleanroom facility capable of war reserve (WR) component production, as well as the integration of research, prototyping, and production functions.	DOE/EA-1335, MESA EA

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Item No.	PHS Name and No. (Date Completed)	Haz. Class and Type*	Representative Programs	Representative Activities	Recent NEPA Reviews
Tech Area I: Microsystems and Engineering Sciences Applications (MESA) Complex (Continued)					
110	HARP (Microfab & Transition Area) PHS No. SNL0A00313-002 (09/21/00)	Low/NN (COTM, M, P)	Defense Programs	The MicroFab provides a cleanroom area for microsystems component post-processing and packaging. The MicroFab will be capable of war reserve (WR) production of microsystems in support of the Stockpile Lifetime Extension Process (SLEP). Silicon-based microsystem components will be fabricated in the Silicon Laboratory; photonic and sensor components will be fabricated in the Flexible Laboratory; and components from both laboratories will be processed and packaged in the Post-Processing and Packaging Laboratory.	DOE/EA-1335, MESA EA
111	HARP (retitled)	Low/NN (COTM, E, L, P)	Defense Programs	The laboratories and workspaces will facilitate design, system integration, and the qualification of weapons systems. This facility will provide for electrical and laser light laboratories that will form the infrastructure needed to develop and prototype subsystems for nuclear weapon refurbishment.	DOE/EA-1335, MESA EA
Tech Area III: Albuquerque Full-Scale Experimental Complex (AFSEC) Test Facilities					
112	HARP AFSEC Test Facilities PHS No. SNL9A00344-002 (04/20/01)	Moderate	• Defense Programs • Work for Others	This PHS is intended to assimilate the hazards of AFSEC TA-III facilities to determine whether any two or more together could constitute a hazard not already considered in individual facility PHSs. The assimilation of these hazards will be used to support the AFSEC line item.	DOE/EIS-0281

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Item No.	PHS Name and No. (Date Completed)	Haz. Class and Type*	Representative Programs	Representative Activities	Recent NEPA Reviews
Tech Area III: Plasma Materials Test Facility					
113	Liquid Surface Experiment PHS No. SNL0A00345-001 (08/19/98)	SIH	Fusion Technology	This lab activity involves the Liquid Surface Experiment–liquid lithium and a tin/lithium alloy in a vacuum chamber using the EBTS electron gun.	• ECL/ADM SNA 96-038, Radiant Heat Facility • DOE/EA-1195, TA III EA (DETT-C)
Tech Area III: Vibration Test Facility					
114	Mass Properties Lab PHS No. SNL1A00204-001 (08/10/01)	Low/NN (E, COTM, EX, R)	Defense Programs	Work in this lab is concentrated on determining mass properties of re-entry vehicles and spacecraft systems.	SNA 01-0662
Tech Area III: Liquid Metal Processing Lab					
115	Large Aircraft Robotic Painting System (LARPS) Coating System PHS No. SNL0A00328-001 (01/07/99)	SIH	Work for Others	The lab supports the LARPS robot which is designed for paint stripping and will be modified to do painting.	DOE/EIS-0281
Tech Area III: Terminal Ballistics Facility					
116	Terminal Ballistics Facility PHS No. SNL9A00192-001 (07/18/00)	SIH	A wide variety of SNL/NM program work is classified as standard industrial hazards (SIH).	SIH activities are consistent with operational hazards in general industrial settings and adequately controlled by OSHA regulations.	ECL/ADM SNA 99-014, Target Preparation and Outdoor Ordnance Firing at the Terminal Ballistics Facility
117	TBF-Indoor Testing and Outdoor Non-Directional Testing PHS No. SNL9A00193-001 (07/18/00)	Low/NN (COTM, EX, K, N)	• Defense Programs • Work for Others	Activities include using the indoor firing range and outdoor testing such as land mine detonations, explosive charges, and shape charges.	ECL/ADM SNA 99-014, Target Preparation and Outdoor Ordnance Firing at the Terminal Ballistics Facility
118	TBF-Indoor Testing and Outdoor Non-Directional Testing PHS No. SNL9A00195-001 (08/02/00)	Low/NN (COTM, EX, K, N)	• Defense Programs • Work for Others	Activities include using the indoor firing range and outdoor testing such as land mine detonations, explosive charges, and shape charges.	ECL/ADM SNA 99-014, Target Preparation and Outdoor Ordnance Firing at the Terminal Ballistics Facility

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Item No.	PHS Name and No. (Date Completed)	Haz. Class and Type*	Representative Programs	Representative Activities	Recent NEPA Reviews
Tech Area III: Terminal Ballistics Facility (Continued)					
119	Terminal Ballistics Facility Outdoor Directional Testing PHS No. SNL9A00223-001 (12/14/99)	Moderate (COTM, EX, K, N)	• Defense Programs • Work for Others	Activities include using the indoor firing range and outdoor testing of projectiles.	ECL/ADM SNA 99-014, Target Preparation and Outdoor Ordnance Firing at the Terminal Ballistics Facility
Tech Area IV: Office/Lab Bldg. – Reactor Support Facility					
120	Laboratory (retitled) PHS No. SNL9A00214-003 (11/03/00)	Low/NN (L, T)	• Work for Others • Defense Programs	Activities involve propagation of a laser from a laboratory to a target shed on the facility.	ECL/ADM SNA 99-045, Advanced Laser Imaging Test
Tech Area IV: Strategic Defense Facility Office/Lab					
121	Wrobel Lab PHS No. SNL0A00316-001 (05/15/00)	SIH	A wide variety of SNL/NM program work is classified as standard industrial hazards (SIH).	SIH activities are consistent with operational hazards in general industrial settings and adequately controlled by OSHA regulations.	DOE/EA-0352
Tech Area IV: Strategic Defense Facility – Heavy Lab					
122	Stronglink Unit Tests PHS No. SNL9A00291-001 (07/12/00)	SIH	A wide variety of SNL/NM program work is classified as standard industrial hazards (SIH).	SIH activities are consistent with operational hazards in general industrial settings and adequately controlled by OSHA regulations.	DOE/EA-0352
Tech Area IV: Simulation Technology Lab					
123	Materials Processing and Coatings Lab PHS No. SNL0A00314-002 (05/22/00)	SIH	A wide variety of SNL/NM program work is classified as standard industrial hazards (SIH).	SIH activities are consistent with operational hazards in general industrial settings and adequately controlled by OSHA regulations.	ECL/ADM SNA 0-021, Relocation and Coordination of Material Processing and Coatings Laboratory

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Item No.	PHS Name and No. (Date Completed)	Haz. Class and Type*	Representative Programs	Representative Activities	Recent NEPA Reviews
Tech Area IV: Simulation Technology Lab (Continued)					
124	Seraphim Motor Demonstration Testbed PHS No. SNL0A00017-001 (01/21/00)	SIH	A wide variety of SNL/NM program work is classified as standard industrial hazards (SIH).	SIH activities are consistent with operational hazards in general industrial settings and adequately controlled by OSHA regulations.	ECL/ADM SNA 96-089, NIF Prototype Test Bed
Tech Area IV: Saturn Facility					
125	Materials Processing and Coatings Lab PHS No. SNL9A00189-001 (07/19/99)	SIH	A wide variety of SNL/NM program work is classified as standard industrial hazards (SIH).	SIH activities are consistent with operational hazards in general industrial settings and adequately controlled by OSHA regulations.	ECL/ADM SNA 0-021, Relocation and Coordination of Material Processing and Coatings Laboratory
Tech Area IV: Components Development Lab					
126	Beamlet Operations (retitled) PHS No. SNL9A00185-005 (11/05/99)	Low/NN (COTM, E, EN, H, L, M, N, NCA, P, T)	Pulsed Power Applications	Diagnostic operations support Z facility activities.	ECL/ADM SNA 98-080, Backlighter Laser
Tech Area V: Reactor Facility					
127	Hot Cell Facility PHS No. SNL9A00349-002 (12/09/00)	Low/NN (E, M, P, R)	• Defense Programs • Work for Others	Low dose-rate irradiation activities use sealed cobalt and cesium sources.	ECL/ADM ECL/ADM SNA 98-040, Component Irradiation Projects CY 98-99 Tech Area V
Tech Area V: Security Services Building					
128	Video Lab PHS No. SNL0A00477-001 (11/15/00)	SIH	A wide variety of SNL/NM program work is classified as standard industrial hazards (SIH).	SIH activities are consistent with operational hazards in general industrial settings and adequately controlled by OSHA regulations.	

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Item No.	PHS Name and No. (Date Completed)	Haz. Class and Type*	Representative Programs	Representative Activities	Recent NEPA Reviews
Tech Area V: Technology Support Center					
129	Dosimetry Light Lab PHS No. SNL9A00226-002 (08/29/00)	SIH	A wide variety of SNL/NM program work is classified as standard industrial hazards (SIH).	This lab provides measurement services and experimental support to the accelerator, reactor, and gamma facilities at SNL/NM. The light lab is used for staging of equipment and for special projects involving small quantities of chemicals and radioactive materials.	
Tech Area V: New Gamma Irradiation Facility					
130	GIF PHS No. SNL0A00042-002 (07/17/00)	Category 3 (EX, NR, R, RGD)	Defense Programs	The new GIF provides SNL/NM with 3 concrete-shielded irradiation cells and an 18-foot-deep pool of water in which the stainless-steel-clad cobalt 60 (Co-60) pins (sealed sources) are stored. The irradiation cells permit dry irradiation operations in which Co-60 sources are raised from the bottom of the pool into the cells on elevators. Typical irradiations performed in the cells are at very high dose rates (100 to 1,000 kilorads/hour) and for short to intermediate durations (less than a day). In-pool irradiations are performed with the sources held in various fixtures in the bottom of the pool. Typical in-pool irradiations are at moderate and low dose rates (<10 kilorads/hr) and for long durations lasting days, weeks, and months.	DOE/EIS-0281

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Item No.	PHS Name and No. (Date Completed)	Haz. Class and Type*	Representative Programs	Representative Activities	Recent NEPA Reviews
Tech Area V: Sandia Pulsed Reactor (SPR) Facility					
131	Small Portable X-Ray Machines PHS No. SNL0A00357-001 (06/28/00)	Low/NN (COTM, NR, R, RGD)	Defense Programs	This facility uses a portable x-ray system to generate a cone of x-rays with a dose rate of 300 R/minute at 1 meter from the source. Projected across the SPR reactor room, this x-ray system generates 180-R/hr fields against the far wall. The 48-inch-thick wall is sufficient to attenuate this field to less than 0.5 mR/hr at the outer surface of the SPR.	DOE/EIS-0281-052, X-ray of Test Object
Tech Area V: Low Level Counting Lab					
132	Radiation Metrology Laboratory (RML) Tech Area V PHS No. SNL9A00225-003 (12/07/00)	Low/NN (COTM, E EN, P, R, T)	Defense Programs	This lab provides measurement services and experimental support.	
Tech Area V: Auxiliary Hot Cell Facility					
133	AHCF PHS No. SNL0A00280-001 (12/13/00)	Category 3 (COTM, EN, R, RGD)	Defense Programs	The Auxiliary Hot Cell Facility characterizes, treats (if required), and repackages radioactive and mixed material and waste for reuse, recycling, or ultimate disposal.	ECL/ADM SNA, 98-063, Modification of Auxiliary Hot Cell Facility
134	AHCF PHS No. SNL9A00221-001 (08/03/99)	Category 3 (COTM, EN, R, RGD)	Defense Programs	The Auxiliary Hot Cell Facility characterizes, treats (if required), and repackages radioactive and mixed material and waste for reuse, recycling, or ultimate disposal.	ECL/ADM SNA, 98-063, Modification of Auxiliary Hot Cell Facility
135	Building 6597/Northside Activities PHS No. SNL9A00220-001 (11/02/99)	Low (COTM, EN, R, RGD)	Defense Programs	The Auxiliary Hot Cell Facility characterizes, treats (if required), and repackages radioactive and mixed material and waste for reuse, recycling, or ultimate disposal.	ECL/ADM SNA, 98-063, Modification of Auxiliary Hot Cell Facility

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Item No.	PHS Name and No. (Date Completed)	Haz. Class and Type*	Representative Programs	Representative Activities	Recent NEPA Reviews
Coyote Canyon Complex: Robotic Vehicle Range (RVR) Development Labs					
136	Bowsled (retitled) PHS No. SNL0A00333-001 (06/14/00)	Low/NN (M, NCA)	Defense Programs	A modified crossbow is used to accelerate test packages into a reaction mass for shock testing.	
CTF: National Solar Thermal Testing Facility (NSTTF)					
137	NSTTF Site PHS PHS No. SNL1A00183 (8/15/01)	Low/NN (COTM, E)	**Work for Others**	Solar thermal components and systems are developed, researched, and tested at this large facility.	ECL/ADM SNA 99-028, FY99 Ecological Program SNA 0-012, FY00 Ecological Program AF 99-014 (AF813) Environmental Assessment SNL/NM FY1999-2000 Ecological Program
138	Fiber Optics Testing at Solar Power Tower PHS No. SNL9A00111-001 (08/09/99)	SIH	**A wide variety of SNL/NM program work is classified as standard industrial hazards (SIH).**	SIH activities are consistent with operational hazards in general industrial settings and adequately controlled by OSHA regulations.	ECL/ADM SNA 99-028, FY99 Ecological Program SNA 0-012, FY00 Ecological Program AF 99-014 (AF813) Environmental Assessment SNL/NM FY1999-2000 Ecological Program
139	Dish Test Area and Enclosures PHS No. SNL9A00202-001 (09/20/99)	SIH	**A wide variety of SNL/NM program work is classified as standard industrial hazards (SIH).**	SIH activities are consistent with operational hazards in general industrial settings and adequately controlled by OSHA regulations.	ECL/ADM SNA 99-028, FY99 Ecological Program SNA 0-012, FY00 Ecological Program AF 99-014 (AF813) Environmental Assessment SNL/NM FY1999-2000 Ecological Program
Eubank Research Park					
140	Lite Model Lab PHS No. SNL0A00018-001 (01/25/00)	SIH	A wide variety of SNL/NM program work is classified as standard industrial hazards (SIH).	SIH activities are consistent with operational hazards in general industrial settings and adequately controlled by OSHA regulations.	
141	Monitoring Systems Light Lab PHS No. SNL0A00019-001 (01/25/00)	SIH	A wide variety of SNL/NM program work is classified as standard industrial hazards (SIH).	SIH activities are consistent with operational hazards in general industrial settings and adequately controlled by OSHA regulations.	
142	Hardwire Lab PHS No. SNL9A00107-001 (04/23/99)	SIH	A wide variety of SNL/NM program work is classified as standard industrial hazards (SIH).	SIH activities are consistent with operational hazards in general industrial settings and adequately controlled by OSHA regulations.	

***Key to Hazard Class and Type:** **B** - Biohazard; **COTM** - Use of chemicals or toxic materials; **E** - Electrical; **EN** - Environmental (e.g., air, discharge, hazardous or radioactive waste); **EX** - Explosives; **H** - High voltage pulsed power circuits; **K** - Equipment or machines that could generate kinetic energy; **L** - Use of lasers; **Low/NN** - Low Nonnuclear; **M** - Mechanical; **N** - Noise; **NCA** - Not commercially available equipment; **NR** - Nonionizing radiation; **P** - Pressure; **R** - Radiation; **RF** - Microwave/RF energy sources; **RGD** - Radiation-generating devices; **SIH** - Standard industrial hazard; **T** - Thermal; **THM** - Transportation of hazardous material.

Item No.	PHS Name and No. (Date Completed)	Haz. Class and Type*	Representative Programs	Representative Activities	Recent NEPA Reviews
Eubank Research Park (Continued)					
143	Building 10500 Light Labs PHS No. SNL0A00372-001 (07/19/00)	SIH	A wide variety of SNL/NM program work is classified as standard industrial hazards (SIH).	SIH activities are consistent with operational hazards in general industrial settings and adequately controlled by OSHA regulations.	
UNM: Advanced Materials Laboratory (AML)					
144	MPS – Surface Science Laboratory (retitled) PHS No. SNL9A00298-001 (12/21/99)	SIH	A wide variety of SNL/NM program work is classified as standard industrial hazards (SIH).	SIH activities are consistent with operational hazards in general industrial settings and adequately controlled by OSHA regulations.	• ECL/ADM SNA 99-025, Five-Year Lease Renewal for the Advanced Materials Lab • ECL/ADM SNA 95-119, Laboratory Operations Materials
145	MPS-Ceramics Processing Lab PHS No. SNL9A00312-001 (11/18/99)	SIH	A wide variety of SNL/NM program work is classified as standard industrial hazards (SIH).	SIH activities are consistent with operational hazards in general industrial settings and adequately controlled by OSHA regulations.	• ECL/ADM SNA 99-025, Five-Year Lease Renewal for the Advanced Materials Lab • ECL/ADM SNA 95-119, Laboratory Operations Materials

Sources: DOE, 1994a, b, 1995, 1997, 1999a, b, 2000; SNL, 2001a.

***Key to Hazard Class and Type: B** - Biohazard; **COTM** - Use of chemicals or toxic materials; **E** - Electrical; **EN** - Environmental (e.g., air, discharge, hazardous or radioactive waste); **EX** - Explosives; **H** - High voltage pulsed power circuits; **K** - Equipment or machines that could generate kinetic energy; **L** - Use of lasers; **Low/NN** - Low Nonnuclear; **M** - Mechanical; **N** - Noise; **NCA** - Not commercially available equipment; **NR** - Nonionizing radiation; **P** - Pressure; **R** - Radiation; **RF** - Microwave/RF energy sources; **RGD** - Radiation-generating devices; **SIH** - Standard industrial hazard; **T** - Thermal; **THM** - Transportation of hazardous material.

A.2 References

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APPENDIX B
CHEMICAL USAGE

CONTENTS

TABLES

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B.1 Introduction

This appendix provides summary information on the chemicals purchased by SNL/NM during FY2001 for use in selected and notable facilities analyzed in the SNL/NM Site-Wide Environmental Impact Statement (SWEIS). Selected and notable facilities are discussed in more detail in the SNL/NM Facilities and Safety Information Document (DOE, 1999; SNL, 1999).

To establish a baseline, SNL/NM chemical usage information included in the SWEIS was based on chemical purchase information for the year 1996. For recent information, SNL/NM Air Quality Group reports provide chemical purchase information for the years 2000 and 2001 (SNL, 2001, 2002). Chemical purchase information is derived from the Sandia Chemical Information System (CIS), a comprehensive database containing over 90 percent of the chemicals handled at SNL/NM.

The chemicals summarized in this appendix are those reported in the SWEIS and subsequent SNL/NM Air Quality Group reports with a total quantity greater than 100 pounds. These are the chemicals that typically pose the greatest risk to human health and the environment. Chemicals purchased infrequently in small quantities are not individually reported, except where their cumulative amounts total more than 100 pounds. This approach focuses information on those chemical quantities of greatest concern and the total quantities purchased.

All the chemicals included in this appendix are categorized as hazardous air pollutants (HAPs), volatile organic compounds (VOCs), or toxic air pollutants (TAPs). In some cases, a chemical may fall into two or more categories (e.g., methanol is listed in all three). Summaries of the chemical usage methodologies used in the SWEIS analysis are discussed here. (See Appendix D of the SWEIS and the SNL/NM Air Quality Group reports for more detail regarding methodologies on chemical purchase and estimated usage information.)

B.2 SWEIS Methodology

The SWEIS used three sources of chemical data: the CIS, Hazardous Chemical Purchases Inventory (HCPI), and CheMaster in identifying potential chemical emissions from facility operations. Each chemical database was developed for different purposes and has some specific or unique information.

Because the CIS compiles annual purchases by building number and tracks 90 percent of all chemical purchases made by SNL/NM, the SWEIS identified the CIS as the most current source of information. Of the 25,000 chemicals of concern originally identified from several SNL/NM databases, the SWEIS presented information on ~465 chemicals, which were identified as the potential sources of routine chemical air emissions from SNL/NM's normal operations. This screening process was designed to capture the major sources of routine chemical air emissions.

B.3 FY2001 SWEIS Annual Review Chemical Usage Methodology

Information in the FY2001 chemical appendix was drawn from the SNL/NM Chemical Purchase Inventory Reports for 2000 and 2001 for the SNL/NM Air Quality Group (SNL, 2001, 2002). These reports summarize the chemical purchases for SNL/NM documented by the CIS and include information for chemicals that are HAPs, VOCs, and TAPs.

As stated, the SWEIS used the CIS as the most current and complete information about chemical use at SNL/NM. The source of chemical usage information for this annual review, the Air

Quality Group reports, uses the same approach as the SWEIS.

The SWEIS screening resulted in a list of ~465 chemicals of concern from a list of some 25,000 chemicals originally identified. The screened list of chemicals of concern that were identified as the potential sources of routine chemical air emissions from SNL/NM's normal operations were then analyzed to assess potential impacts to worker and public human health. This information can readily be compared to the Air Quality Group reports. In the SWEIS analysis, these chemical emissions were assumed to be released from a prototypical stack located in Technical Area I. Specific locations of the chemical emissions, therefore, were not a determining factor in the SWEIS analysis.

The chemical emission information included in the FY2001 SWEIS Annual Review is consistent with the SWEIS data, since both the Air Quality Group reports and the Annual Review rely on the CIS as the best available data source.

B.4 Compiled Data

Summary chemical emissions data is included in Tables B-1, B-2, and B-3, which contain information on VOCs, HAPs, and TAPs, respectively. Tables B-1, B-2, and B-3 include ~34 chemicals, 26 chemicals, and 51 chemicals, respectively. Usage of many of these chemicals is small, less than 1,000 pounds (lb) (454 kilograms [kg]).

As shown in Tables B-1, B-2, and B-3, the total quantities of chemicals in FY2000 and FY2001 were below both the SWEIS baseline (FY1996) and the SWEIS expanded operations alternative. However, individual chemicals purchased in FY2000 or FY2001 may have quantities larger than the SWEIS baseline (FY1996), the SWEIS expanded operations, or both. The vast majority of chemicals reported in these tables are specialty chemicals found in most laboratories. As a result, SNL/NM chemical purchases (quantity and type) fluctuate greatly from year to year.

It is difficult to draw conclusions about the effects of the large fluctuations (type and quantity) in chemical purchases on a year-by-year basis as it relates to the SWEIS analysis. The SWEIS analysis considered a conservative screening level (occupational exposure limit [OEL] divided by 100) as a basis for impact analysis. Therefore, even if a purchase quantity exceeds the quantity reported in the SWEIS expanded operations alternative, it is unlikely to exceed the OEL/100 screen. In addition, even if a chemical purchase quantity exceeded the OEL/100 screening level, it is probable (based on the analysis presented in Appendix D of the SWEIS) that an engineering control is in place to mitigate or reduce any potential emissions.

Several conclusions, however, may be drawn from the compiled data. Overall quantities of chemicals purchased since 1996 are decreasing. In CY1996, chemical usage was estimated at 55,282 lb. According to the SNL/NM Air Quality Group chemical purchase information reports, in CY1998 and CY2000, the usage decreased to 50,792 lb and 50,093 lb, respectively. The reports also show, since CY1998, chemical purchases associated with HAP and VOC emissions declined from 14,000 lb and 35,000 lb to 7,200 lb and 22,000 lb, respectively, in CY2000. In many cases, it appears that chemical substitution is occurring, as chlorinated solvents are replaced by increasing purchases of methanol, ethanol, and other alcohols. However, without detailed analysis of end-use information, which is outside the scope of this document, this cannot be confirmed.

Table B-1. Chemical Purchases Potentially Resulting in Volatile Organic Compounds Emissions (Fiscal Years 1996, 2000, and 2001 and SWEIS Expanded Operations Alternative) in Pounds

Chemical Abstract Services (CAS) #	Chemical	SWEIS (FY1996) in Pounds	SWEIS (EOA) in Pounds	FY2000 in Pounds	FY2001 in Pounds
156-60-5	1,2-Dichloroethylene	<1	224.4	111.13	92.51
540-84-1	2,2,4-Trimethylpentane	<1	<1	192.23	583.91
112-34-5	2-Butyl oxyethanol dipropylene glycol	86.88	173.14	145.27	156.49
64-19-7	Acetic acid	369.56	784.2	1,158.93	1,251.32
67-64-1	Acetone	6,870.3	18,435	4,594.21	6,068
75-05-8	Acetonitrile	42.34	69.96	195.31	311
100-51-6	Alcohol, benzyl	610	1,792	82.7	39.6
71-43-2	benzene	52.47	176	69.46	54.6
75-63-8	Bromotrifluoromethane	<1	<1	<1	<1
67-66-3	Chloroform	243.68	52.14	216.39	55.1
64742-53-6	Distillate	<1	<1	46.69	92,780.84
64-17-5	Ethanol	22,929.02	440.5	4,575.16	10,370.16
141-78-6	Ethyl acetate	48.26	57.15	82.79	220.83
60-29-7	Ethyl ether (diethyl ether)	48.07	48	248.45	1,352.89
78-10-4	Ethyl silicate	2.44	11.67	205.44	139.06
74-85-1	Ethylene	114	226.6	44	40.9
107-21-1	Ethylene glycol	174.17	421.5	966.25	935
64-18-6	Formic acid	12.52	25.08	128.84	50.91
123-92-2	Isoamyl acetate	584.33	<1	243.33	451.70
78-83-1	Isobutyl alcohol	<1	1,994	49.51	98.59
67-63-0	Isopropyl alcohol	1,251.08	574.2	3,079.54	2,837
67-56-1	Methanol	1,762	3,652	1,732.24	1,912
108-65-6	Methoxy acetate	150.23	282.6	1,053.35	1,425.77
108-10-1	Methyl isobutyl ketone	45.017	150.5	6.43	55.66
68-12-2	n,n-Dimethylformamide	<1	<1	101.26	64.07
8030-30-6	Naphtha	<1	<1	144.33	287.24
110-54-3	n-Hexane	34.4	40.4	347.37	512
872-50-4	n-Methyl-2-pyrrolidone	110.69	268.66	307.62	145
71-23-8	Propyl alcohol	74.66	83.4	2,079.04	2,429.49
57-55-6	Propylene glycol	<1	<1	1,774.76	1,084.65
127-18-4	Tetrachloroethylene	2,227.05	<1	<1	87.06
109-99-9	Tetrahydrofuran	34.1	58	724.42	802.86
108-88-3	Toluene	51.76	111.36	449.74	505
79-01-6	Trichloroethylene	1,716.37	3,364	91.26	107
TOTAL QUANTITIES		**39,953.40**	**33,526.46**	**25,249.45**	

EOA = Expanded Operations Alternative.

Sources: DOE, 1999a; SNL, 2000, 2001.
Note: For simplicity purposes, the "<1" may include zero.

Table B-2. Chemical Purchases Potentially Resulting in Hazardous Air Pollutants (HAP) Emissions (Fiscal Years 1996, 2000, and 2001 and SWEIS Expanded Operations Alternative) in Pounds

Chemical Abstract Services (CAS) #	Chemical	SWEIS (FY1996) in Pounds	SWEIS (EOA) in Pounds	FY2000 in Pounds	FY2001 in Pounds
71-55-6	1,1,1-Trichloroethane	198.01	369.6	<1	74.1
540-84-1	2,2,4-Trimethylpentane	<1	<1	192.23	583.91
101-77-9	4,4'-Methylene dianiline (37%)	123.04	369.6	<1	8.28
65-73-97	4-Nitrophenol	<1	<1	1,234.13	<1
75-05-8	Acetonitrile	42.34	69.96	195.31	311
7784-42-1	Arsine	125.29	374	68	<1
71-43-2	Benzene	52.47	176	69.46	54.6
7782-50-5	Chlorine	<1	554.4	<1	31
67-66-3	Chloroform (trichloromethane)	243.68	52.14	216.39	55.1
7440-47-3	Chromium	52.55	115.9	1.92	1.48
7440-48-4	Cobalt	52.55	111.8	<1	18.7
75-09-02	Dichloromethane	501.2	965.8	558.34	355
111-42-2	Diethanolamine	239.22	699.6	22.96	1.65
107-21-1	Ethylene glycol	174.17	421.5	966.25	935
7664-39-3	Hydrogen fluoride	291.88	437.4	255.28	472
7439-97-6	Mercury	59.98	119.68	5.01	4.22
67-56-1	Methanol	1,762	3,652	1,732.24	1,912
108-10-1	Methyl iso- butyl ketone	45.02	150.5	6.43	19.1
68-12-2	n, n-Dimethylformamide	<1	<1	101.26	139
110-54-3	n-Hexane	34.4	40.4	347.37	512
7440-02-0	Nickel	47.72	107.8	39.1	70.3
7718-54-9	Nickel Chloride	586.53	1,755.6	<1	9.76
7786-81-4	Nickel Sulfate	586.53	1,755.6	<1	49.10
7803-51-2	Phosphine	<1	128.74	<1	<1
127-18-4	Tetrachloroethylene	2,227.05	<1	<1	17.9
108-88-3	Toluene	51.76	111.36	449.74	505
79-01-6	Trichloroethylene	1,716.37	3,364	91.26	107
51-79-6	Urethane	<1	<1	411.38	<1
TOTAL QUANTITIES		9,219.78	15,908.38	6,972.06	

Sources: DOE, 1999; SNL, 2000, 2001.
Notes: For simplicity purposes, the "<1" may include zero. Hydrogen chloride was excluded due to differences in reporting methodologies between the SWEIS and the annual reports. Hydrogen chloride is used as an industrial chemical in water treatment processes.

Table B-3. Chemical Purchases Potentially Resulting in Toxic Air Pollutants (TAP) Emissions (Fiscal Years 1996, 2000, and 2001 and SWEIS Expanded Operations Alternative) in Pounds

Chemical Abstract Services (CAS) #	Chemical	SWEIS (FY1996) in Pounds	SWEIS (EOA) in Pounds	FY2000 in Pounds	FY2001 in Pounds
100-02-7	4-Nitrophenol	<1	<1	1,234.13	<1
64-19-7	Acetic acid	369.56	784.2	1,158.93	1,251.32
67-64-1	Acetone	6,870.3	18,435	8,532.72	6,068
75-05-8	Acetonitrile	42.34	69.96	195.31	311
67-63-0	Alcohol, isopropyl	1,251.08	574.2	3,079.54	2,837
7429-90-5	Aluminum	464.6	1510	<1	13.7
1344-28-1	Aluminum oxide	3,906	793.2	537.41	530
7664-41-7	Ammonia	59.98	4,324	694.2	118
12125-02-9	Ammonium chloride	220.28	44	<1	17.19
1336-21-6	Ammonium hydroxide	2,579.85	7,744	<1	681.50
7784-42-1	Arsine	125.29	374	68	<1
71-43-2	Benzene	52.47	176	69.46	54.6
1113-50-1	Boric acid	87.98	264	<1	<1
67-66-3	Chloroform	243.68	52.14	216.39	55.1
7440-47-3	Chromium	52.55	115.9	1.92	1.48
7440-50-8	Copper	608.62	1,497	72.39	22.3
75-09-02	Dichloromethane	501.2	965.8	558.34	355
106-42-4	Di-p-xylene	602	1,995.4	<1	<1
141-78-6	Ethyl acetate	48.26	57.15	82.79	221.83
60-29-7	Ethyl ether	48.07	48	248.45	1,352.89
78-10-4	Ethyl silicate	2.44	11.67	205.44	139.06
107-21-1	Ethylene glycol	174.17	421.5	966.25	935
64-18-6	Formic acid	12.52	25.08	128.84	7.99
7664-39-3	Hydrogen fluoride	291.88	437.4	255.28	472
7722-84-1	Hydrogen peroxide	4,002	7,581	<1	3,342.86
1309-37-1	Iron	45.6	150.3	<1	176.62
123-92-2	Iso amyl acetate	584.3	1,746.8	<1	451.70
67-63-0	Isopropyl alcohol	1,251.08	574.2	3,079.54	2,837
8008-20-6	Kerosene	6.64	6.62	41.77	179.39
67-56-1	Methanol	1,762	3,652	1,732.24	1,912
108-10-1	Methyl isobutyl ketone	45.02	150.5	6.43	19.1
75-09-2	Methylene chloride	501.2	965.8	558.34	355
68-12-2	n, n-dimethylformamide	<1	<1	101.26	139
71-23-8	n-Butyl alcohol	89.87	30.0	43.91	<1

Table B-3. Chemical Purchases Potentially Resulting in Toxic Air Pollutants (TAP) Emissions (Fiscal Years 1996, 2000, and 2001 and SWEIS Expanded Operations Alternative) in Pounds (Continued)

Chemical Abstract Services (CAS) #	Chemical	SWEIS (FY1996) in Pounds	SWEIS (EOA) in Pounds	FY2000 in Pounds	FY2001 in Pounds
110-54-3	n-Hexane	34.4	40.4	347.37	512
7440-02-0	Nickel	47.7	107.8	39.1	70.3
7697-37-2	Nitric acid	5,309.9	10,275	2,907.28	1,317
872-50-4	n-Methyl-2-pyrrolidone	110.69	268.66	307.62	145
127-18-4	Perchloroethylene	2,227	2,222	<1	17.9
7664-38-2	Phosphoric acid	191.4	455	499.16	609
71-23-8	Propyl alcohol	74.66	83.4	2,079.04	2,429.49
7803-62-5	Silane (silicon tetrahydride)	224.91	430.4	<1	6.02
7631-86-9	Silica	611.8	2,017	<1	1,653.20
7664-93-9	Sulfuric acid	432.78	1,904.9	391.2	3,130.92
109-99-9	Tetrahydrofuran	34.1	58	724.42	802.86
108-88-3	Toluene	51.76	111.36	449.74	505
79-01-6	Trichloroethylene	1,716.37	3,364	91.26	107
7440-33-7	Tungsten as Wolfram	60.42	120.8	<1	143.84
51-79-6	Urethane	<1	<1	411.38	<1
7440-66-6	Zinc	2.23	4.9	121.7	16.9
TOTAL QUANTITIES		**38,241.90**	**77,661.64**	**32,251.55**	

Sources: DOE, 1999; SNL, 2000, 2001.

Notes: For simplicity purposes, the "<1" may include zero. Hydrogen chloride and sodium hydroxide were excluded due to differences in reporting methodologies between the SWEIS and the annual reports. Both chemicals are used as industrial chemicals in water treatment processes. The following 12 chemicals were excluded because no CAS was assigned in the SWEIS: 2,6-Diethylaniline curing agent, Carboxyl terminated acrylonitrile butadiene, Cerric ammonium nitrate, Citridet Cleaner, Curing agent Z, Diala oil, Fluorinert, Glass microballoons filler, Hexylene glycol, Mold release, Sulfur hexafluoride, and Ultima Gold-Packard. None of the 12 chemicals were purchased in 1999 or 2000.

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Notes